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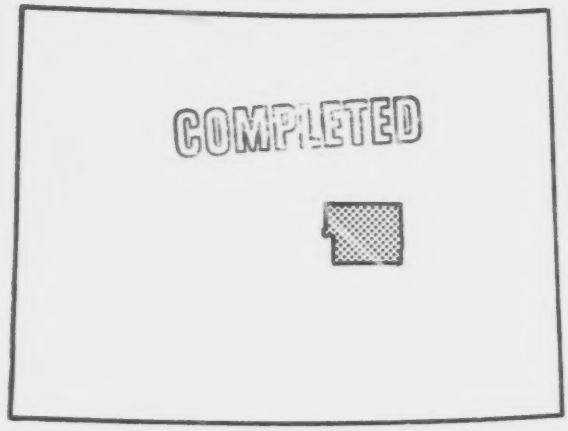
FLOOD INSURANCE STUDY



EL PASO COUNTY, COLORADO
UNINCORPORATED AREAS

VOLUME 1 OF 4

REVISED: SEPTEMBER 28, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - 080059

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 10.0.

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of El Paso County, Colorado, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE), Albuquerque District, under Inter-Agency Agreement No. H-7-76, Project Order No. 12, Amendments Nos. 2 and 6, and by Camp Dresser and McKee, Inc. (CDM) under Contract No. EMW-C-0046, for the Federal Emergency Management Agency (FEMA). This study was completed in July 1982.

The hydrologic and hydraulic analyses for Dry Creek and its tributaries were performed by KKBNA, Inc. This work was completed in January 1984.

1.3 Coordination

An initial coordination meeting was attended by representatives of the COE, FEMA, Colorado Water Conservation Board (CWCB), and the El Paso County Land Use Administration and Planning Department in May 1975. An intermediate coordination meeting was attended by representatives from El Paso County and the City of Colorado Springs,

the Pikes Peak Area Council of Governments (PPACG), FEMA, and the study contractor on September 19, 1980. The purpose of this meeting was to discuss the nature of the study, the scope and limits of work, and available flood information concerning the study area.

During the course of work by the study contractor, hydrologic and hydraulic information was obtained from the FEMA, COE, U.S. Soil Conservation Service (SCS), CWCB, PPACG, El Paso County Land Use Department, local municipalities, engineering firms, land developers, utilities and private citizens.

The results of the study were reviewed at a final community coordination meeting held on January 23, 1984, and attended by the representatives of the study contractor, FEMA, CWCB, and El Paso County. All problems raised at that meeting have been resolved in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated area of El Paso County, Colorado. The area of study is shown on the Vicinity Map (Figure 1).

Areas excluded from this study were the U.S. Air Force Academy and Fort Carson Military Reservation; the Cities of Fountain, Manitou Springs, and Colorado Springs; and the Towns of Palmer Lake, Green Mountain Falls, Ramah, Monument and Calhan.

Floods caused by overflow from Cottonwood Creek, Dry Creek, Fountain Creek, Upper Fountain Creek, Jimmy Camp Creek, Corral Tributary to Jimmy Camp Creek, East Tributary Jimmy Camp Creek, Franceville Tributary to Jimmy Camp Creek, Mines Subtributary to Corral Tributary, Kettle Creek, Monument Creek, Monument Creek Tributary, Peterson Field Drainage, Pine Creek, Sand Creek, Sand Creek Center Tributary, Sand Creek East Fork, Sand Creek East Fork Subtributary, Security Creek, Spring Creek, Templeton Gap Floodway, Widefield Creek, and Windmill Gulch were studied in detail.

Flood plains were delineated throughout El Paso County including the unincorporated communities of Chipita Park, Cascade, Security, and Widefield. Also, the Fountain Creek flood plains were delineated within Pike National Forest boundaries between Green Mountain Falls and Manitou Springs. Flood plains of Monument, Pine, and Kettle Creeks were not delineated within the boundaries of the U.S. Air Force Academy.

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The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through May 1991.

2.2 Community Description

El Paso County is located in central Colorado. The northern county boundary is approximately 40 miles south of Denver, Colorado. The southern boundary is 20 miles north of Pueblo, Colorado. A portion of Pike National Forest is in western El Paso County. The county has an approximate land area of 2,100 square miles.

El Paso County is bordered by the counties of Douglas, Elbert, Lincoln, Pueblo, Fremont, and Teller.

The 1980 population was 309,424 for the county and 215,150 in Colorado Springs (Reference 1). The largest concentration of people other than Colorado Springs is the Fountain/Widefield/Security area.

The economy of the county is primarily based on tourism, skiing, light industry, commerce, farming, and ranching. Also, the economy benefits from the Fort Carson Military Reservation, Peterson Field Air Force Base, the U.S. Air Force Academy, and the NORAD installation. Major tourist attractions of the area include the Garden of the Gods, Pike National Forest, Manitou Springs, the U.S. Air Force Academy, and the Broadmoor Hotel.

Interstate Highway 25, U.S. Highway 85-87, State Highways 24, 115, 94, 83, and County Road 38 are located in the flood plains of the county. Rail lines serving the county are the Denver and Rio Grande Western (D&RGW) Railroad Company; Chicago, Rock Island and Pacific (CRI&P) Railroad Company; and Atchison, Topeka and Santa Fe (AT&SF) Railway Company.

The growth rate of Colorado Springs has been among the highest in the nation since 1970. Development is continuing at a relatively high rate. Most of the residential development is along the northeastern and eastern corporate limits. Major housing developments are planned for the Pine Creek, Kettle Creek, Cottonwood Creek, Jimmy Camp Creek, and Sand Creek basins.

Fountain Creek originates approximately 5 miles northwest of Green Mountain Falls in Teller County. From its headwaters, Fountain Creek flows southeasterly for approximately 18 miles, often exceeding a gradient of 150 feet per mile, to join Monument Creek. The headwaters are fed from glacial snow packs and springs of the alpine canyons of Pikes Peak. Glacial deposits remain in many of the valleys above the 9,500-foot elevation. The aspen-, spruce-, and

pine-covered narrow canyons are straight, steep-walled, and well drained. The bedrock creek channel, strewn with boulders, averages 50 feet in width above the foothills.

The foothills are a narrow transition from the mountains to the high plains. The transitional area varies from rough parallel ridges to narrow, gently sloping mesas with pine, pinion, cedar, and oak cover. The stream emerges on the high plains in Colorado Springs. South of Colorado Springs, the watershed west of the creek is in the foothills, while the eastern watershed is primarily high plains. This area to the El Paso-Pueblo County line averages a gradient of 26 feet per mile. The rolling high plains terrain is rough, broken, and sparsely vegetated. The sparse vegetation is typical of the semiarid high plains--predominantly brush, cactus and native grasses. The flood plain is comprised of narrow-strip irrigated farms, clumps of cottonwood trees, salt cedar, and other thick undergrowth.

The approximate drainage area above the confluence with the Arkansas River is 917 square miles. For reporting purposes, the stream segment above the northern corporate boundary of Manitou Springs was labeled Upper Fountain Creek.

Cottonwood Creek, an east bank tributary of Monument Creek, originates near Black Forest and has an approximate drainage area of 18 square miles above its confluence with Monument Creek. The upper reach has an approximate gradient of 193 feet per mile. The lower reach, which is flat and wide, has an approximate gradient of 88 feet per mile. The stream along most of its course is deeply eroded into rock outcrops and, in the lower reach, is lined with willows. Within the corporate areas, developers have confined Cottonwood Creek to a sand-bottom, riprap-sided channel.

Dry Creek and its tributaries drain the Dry Creek Basin. The Dry Creek Basin is bounded on the west by the Front Range of the Rocky Mountains, on the south and north by ridges, and on the east by Monument Creek. It slopes from west to east toward Monument Creek, rising from an elevation of 6,250 feet to an elevation of 9,250 feet. The western portion of the basin in heavily forested, mountainous terrain, drained by three major tributaries of Dry Creek. The central portion of the basin is characterized by gently rolling wide valleys, separated by foothill ridges and mesas. Through the central portion of the basin, Dry Creek is poorly defined and flows through broad, gently sloping meadows. The eastern portion of the basin is fully developed, and Dry Creek flows through well defined and eroded channels as well as greenbelt areas (Reference 2). for the most part, flow in Dry Creek and its tributaries is intermittent.

Jimmy Camp Creek originates in the high plains approximately 7 miles northeast of Colorado Springs. The watershed is approximately 17 miles long and averages approximately 4 miles wide. Jimmy Camp

Creek has three main tributaries: Corral, Franceville, and East. Jimmy Camp Creek is typically sandy, flat, and wide. Above its confluence with Fountain Creek, just south of the City of Fountain, the drainage basin is approximately 66 square miles. The topography of the area is characterized by rolling hills and ridges which are generally steeper in the upper reaches of the watershed. A fourth stream, Mines Subtributary, has its confluence at Corral Tributary.

Kettle Creek, a left-bank tributary to Monument Creek, has its headwaters on the western slope of the Black Forest, northeast of Colorado Springs. A 2-mile segment of the lower reach is within the U.S. Air Force Academy boundaries. Typically, the creek cuts a narrow, deep canyon. It has a drainage area of approximately 17 square miles, and is subject to urban development throughout much of the basin.

Monument Creek originates in northwestern El Paso County, west of the community of Palmer Lake and flows 35.7 miles to join Fountain Creek in southwestern Colorado Springs. It has a drainage area of approximately 238 square miles. From its source, this perennial stream flows easterly for approximately 8 miles, descending from a 9,350-foot elevation through precipitous canyons and transitional foothills to emerge near Palmer Lake at the 7,100-foot elevation. It then turns south and parallels the mountains for the remaining distance to its confluence with Fountain Creek. Fountain Creek is generally entrenched, with an average slope of approximately 30 feet per mile. Within the City of Colorado Springs, Fountain Creek has been channelized for approximately 7,000 feet. West of the main stem of the creek, the rough and broken mountain terrain vegetation ranges from mixed coniferous trees to hardy shrubs and typical mountain grasses. East of the main stem, the high plateau descends gradually to generally rolling land covered by grass with some shrubs and brushes. Both coniferous and deciduous trees grow along the creek banks.

Monument Creek Tributary flows southerly into the upper reach of Monument Creek near the community of Palmer Lake. The terrain consists of transitional foothills with poorly drained soils, which are covered with vegetation ranging from mixed coniferous trees to scrub oaks and grasses. The flood plains are generally limited to narrow strips along each side of the low-water channel and lake. There is limited development, with most residential and commercial development located outside the limits of the flood plain (Reference 3).

The Peterson Field Drainage is a left-bank tributary of Sand Creek, entering Sand Creek approximately 0.25 mile from its confluence

with Fountain Creek. The upper one-third of the basin is characterized by shallow swales that convey overland flow across Peterson Airfield. Detention ponds under development within the airfield boundaries substantially limit peak flows from this area and have been considered in this study. The lower portions of the drainage are characterized by light industrial and residential development, with the channel being concrete lined from Monica Drive to the confluence with Sand Creek.

Pine Creek, a narrow, deep stream, joins Monument Creek just north of Colorado Springs. The Pine Creek basin is 7 miles long and it has a drainage area of approximately 10 square miles. The upper reach of Pine Creek is an area of potential development. The lower reach borders the U.S. Air Force Academy. Heavy commercial development has taken place in the lower portions of the Pine Creek basin.

Sand Creek has three main tributaries: Center, East Fork Subtributary, and East Fork. East Fork Subtributary is tributary to East Fork Sand Creek, which has not been studied in detail above their confluence. These streams are typically shallow, wide, and sandy. Sand Creek is typical of many ephemeral streams in that the channel tends to meander over a period of years. Historical evidence of meandering is predominant in the lower reaches where there is relatively less topographic relief and the channel broadens into and becomes part of the flood plain. The drainage basin encompasses an area of approximately 53 square miles. Sand Creek runs through the county in two areas: south of Colorado Springs at the confluence with Fountain Creek and east of Colorado Springs. The latter area is one of growth as Colorado Springs develops eastward.

Spring Creek originates in east-southeastern Colorado Springs, flows southwesterly, and drains an area of approximately 8 square miles. At a point 0.5 mile upstream of the confluence with Fountain Creek, Spring Creek enters El Paso County. The Spring Creek valley is relatively wide in the northern two-thirds of the basin, becoming deep and narrow in the lower one-third. The flood plain is completely developed with long reaches of concrete-lined channels in residential and commercial areas in addition to Valley Hi Golf Course.

Templeton Gap Floodway drains an area of approximately 8.5 square miles of the northern portion of the Shooks Run basin. This Monument Creek tributary originates in northeastern Colorado Springs, southeast of the Austin Bluffs. A section of unincorporated county land is located in the upper reach of the floodway. This area is a fully developed residential area.

The Security Creek, Widefield Creek, and Windmill Gulch drainage basins are adjacent and drain the areas north and east of the Security-Widefield community. Windmill Gulch drains into Security

Creek, which in turn drains into Widefield Creek. Above the Widefield Creek confluence with Fountain Creek, the drainage area is approximately 15 square miles.

The western portion of El Paso County is in the Rampart Range of the Rocky Mountains, while the remainder is in a high plains region. Elevations range from 14,110 feet to 5,150 feet at the southern county line.

Physiographically, the study area east of Monument and Fountain Creeks is characterized by gently sloping plains; west of the creeks, by mountain ranges and basins. There are some horizontal sedimentary outcrops in the Black Forest area which represent rock formations from the Rocky Mountain uplift some 60 million years ago. Exposed sedimentary rocks along the edge of the mountain front are tilted. Above the sedimentary foothills the pre-Cambrian mountain core is largely of Pikes Peak granite.

Soils of the region exhibit characteristics that are directly related to their physiographic position. The highest of three physiographic positions, semiarid mountains and foothills, is comprised of rock outcrop and deep (greater than 40 inches to bedrock) to moderately deep (20 to 40 inches to bedrock) soils formed by material derived from acid igneous rock or hard sedimentary rock. The lesser extensive soils formed through the erosion and weathering of acid igneous rock are 35 to 60 percent cobble with a loamy matrix, while more extensive soils formed with material derived from sedimentary rock generally are loamy with 0 to 25 percent gravel. The lowest of the physiographic positions, semiarid to arid plains, has deep to shallow soils that form in eolian and alluvial deposits as well as material derived from clayey shales. Deep soils forming eolian and alluvial deposits are well drained, sandy to clayey, and are usually lacking in rock (gravel or cobble) fragments, while shallow soils formed with materials derived from shale are clayey, lacking in significant gravel, and are well drained. The intermediate physiographic position, semiarid foothills and plains, is dominated by soils derived from hard sedimentary rock, but also has a few soils formed in alluvium and from interbedded sandstone and shale. Soils formed with material derived from hard sedimentary rock are sandy or loamy, well drained, and have less than 10 percent gravel (Reference 4).

Generally, the mountain and foothill areas have high coefficients of runoff, steep stream gradients and narrow flood plains. High plains areas generally have a lower coefficient of runoff, gradual elevation changes, and relatively broad streambeds and flood plains.

Within the region, precipitation varies considerably because of elevations, major wind currents, and local geographic features. Winter storms, typically from the northwest, tend to lose their moisture on the western side of the Rocky Mountains. The major

precipitation is due to late spring snows influenced by southeasterly winds on upslopes and from summer thunderstorms. Pikes Peak produces a "rain shadow" which causes a semiarid zone to the east. Annual precipitation varies from a low of 8 inches to a high of 20 inches in the higher elevations. Normal annual precipitation for Colorado Springs is 13.2 inches, with the normal maximum monthly amount of 2.4 inches occurring in July (Reference 5).

2.3 Principal Flood Problems

Most of the flood-producing storms in the study area occur from May through August. The most severe storms occur in late spring or early fall when polar air intrusions are more intense. Isolated summer thunderstorms are frequently severe, but limited in areal extent. Available records do not indicate that snowmelt has contributed significantly to flood occurrences in the study area. Floods are characterized by high peak flows, moderate volumes, and short durations.

Available flood history for El Paso County is almost exclusively concerned with the larger aspects of flooding on Fountain or Monument Creeks in the urbanized areas. Major flooding probably included simultaneous flooding on the smaller streams as well. References to the smaller streams appeared only rarely in newspaper accounts until recently. Specific information on the intensity, duration, and magnitude of the storms and flood effects is generally lacking.

The May 1935 flood is the largest recorded flood: 55,000 cubic feet per second (cfs) on the Fountain Creek above the confluence with Jimmy Camp Creek (Reference 6). This storm, which was concentrated chiefly over the Kettle Creek basin, also caused the largest known flood on Monument Creek, 50,000 cfs (Reference 7). In Colorado Springs, Monument Creek attained its peak flow within 2.5 hours and was back within the banks 3 hours later. The flow rate of this flood exceeded the estimated 500-year peak flow rate of the area.

Below the confluence of Jimmy Camp Creek with Fountain Creek, the June 1965 flood probably exceeded all known floods in El Paso County. This flood was caused primarily by Jimmy Camp Creek. At a point 4.5 miles above the confluence with Fountain Creek, the estimated peak discharge was 124,000 cfs (Reference 6), which is estimated to be a recurrence interval far exceeding 500 years.

Developments subject to flood damage consist of residential properties and commercial and light industrial establishments. Some bridges and culverts across the streams are constrictive to floodflows and contribute to flooding problems. Generally, the bridges across Fountain and Monument Creeks will pass at least the 100-year flood, with the most constrictive bridges and culverts being on the smaller streams. Other obstructions to floodflows include

landfills and isolated levees that have been constructed to protect commercial and residential properties from flooding. Large floods are relatively unaffected by these levees. The greatest obstruction is that of houses adjacent to the banks of streams. This usually occurs in the mountainous and hilly basins such as Upper Fountain Creek.

2.4 Flood Protection Measures

Two significant water-regulating facilities in the area are Kettle Creek Diversion Dam and Big Johnson Reservoir. The latter is also called Fountain Valley Reservoir Dam No. 2 and is located east of the Security-Widefield community. Big Johnson Reservoir is privately owned by the Fountain Mutual Irrigation Company for the primary purpose of irrigation. The drainage area is approximately 3.1 square miles and the maximum storage is 7,000 acre-feet. The dam was modeled as having no effect on the 100- and 500-year water-surface elevations.

Kettle Creek Diversion Dam, owned by the U.S. Air Force, is located on U.S. Air Force Academy grounds. The earthen dam was constructed for flood control and the reservoir receives water from a drainage area of 16.3 square miles and has a maximum storage of 2,900 acre-feet. The dam was designed to detain flows associated with the Standard Project Flood (SPF) for the Kettle Creek basin and limit the discharge to approximately the 10-year recurrence interval.

The Peterson Field Drainage is controlled by stream-water detention ponds sited at the Peterson Airfield. These ponds substantially reduce the peak flows from the upper 3.5 square miles of drainageway.

The Templeton Gap Floodway (Reference 8) consists of a 10,590-foot-long trapezoidal channel extending from Templeton Gap in a southwesterly direction to Mile 5 on Monument Creek. The floodway has a capacity of 14,000 cfs (approximately a 100-year frequency flood).

There are several small earthen dams, stock ponds, canals, and diversion ditches in the study area, but they have no regulatory significance. Generally, the structures divert low flows for irrigation and have little or no effect on major flows.

Several streams in the Colorado Springs area have been channelized in concrete drainageways with sufficient capacity to contain 100-year peak discharges. Streams affecting the county where this has occurred are Sand Creek, Spring Creek, Peterson Field Drainage, and portions of Dry Creek.

The middle and upper portions of Cottonwood Creek around Colorado Springs have undergone channel improvements consisting of channel widening, riprap channel banks, and levee systems.

The National Oceanic and Atmospheric Administration, in cooperation with communities within El Paso County, has established a Flash Flood Warning System consisting of observers and automatic alarm systems (Reference 9).

In the El Paso County Land Development Code, there is a zoning regulation (IV-Section 32, 1980) restricting the construction of structures in the delineated flood plains. The flood plain districts restrict land use to agriculture, grazing, recreation, and parking areas.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in El Paso, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting El Paso County.

Four sources of information were used to estimate peak discharge-frequency relationships for the streams studied in detail: (1) hydrology studies designated by the State of Colorado for local use in flood plain regulation; (2) material adopted from a 1976 COE hydrologic report for El Paso County (Reference 10); (3) new material generated from other existing information and reports, or (4) new hydrologic data developed by CDM.

The hydrologic analyses used for Sand Creek and Sand Creek's tributaries, as well as Jimmy Camp Creek and associated tributaries upstream of Peacedul Valley Road were obtained from SCS Flood Hazard Analysis reports (References 11 and 12). The SCS report used SCS hydrologic methods to develop peak discharges for the 10-, 50-, and 100-year recurrence intervals. The 500-year peak discharge was obtained by extrapolating the 10-, 50-, and 100-year peak discharges on log-probability paper. Because of inadequate streamflow data on these streams, a synthetic rainfall-runoff evaluation procedure was used to verify these studies. The SCS studies have been designated by the CWCB as complying with state statutory requirements.

For Jimmy Camp Creek below Peaceful Valley Road, the peak flow rates were developed by the COE and obtained from the December 1976 Report on Hydrologic Investigations (Reference 10). Synthetic unit hydrographs and rainfall data from the National Oceanic and Atmospheric Administration report, Precipitation-Frequency Atlas of the Western United States (Reference 13), were used to develop the peak discharges.

Flow rates for Fountain Creek, Upper Fountain Creek, and Monument Creek downstream of the U.S. Air Force Academy were adopted from a COE 1976 hydrology report (Reference 10) and a 1973 Flood Plain Information report (Reference 6). This hydrologic method consists of gage station analysis, whereby stream gaging data have been analyzed to estimate peak flows for the various recurrence intervals. Peak discharges for Cottonwood Creek, Security Creek, Widefield Creek, and Windmill Gulch were also obtained from hydrologic information compiled in the 1976 COE report (Reference 10). In the urban basins and subbasins, synthetic unit hydrographs were used to develop the peakflow rates for the 10-, 50-, and 100-year recurrence intervals. Rainfall patterns and amounts were obtained for the basins using the National Oceanic and Atmospheric Administration (NOAA) data (Reference 13). The 500-year peak discharge was obtained through extrapolation of the 10-, 50-, and 100-year flood results on log-probability paper. In the rural areas with natural-flow streams, the peak flow rates were obtained using hydrologic methods outlined in the Manual for Estimating Flood Characteristics of Natural-Flow Streams prepared jointly by the CWCB and the U.S. Department of the Interior Geological Survey (USGS) (Reference 14).

Pine Creek and Monument Creek upstream of the U.S. Air Force Academy and Kettle Creek peak discharges were also determined using the CWCB and USGS hydrologic report (Reference 14). The "S" curves used in the synthetic unit hydrograph analysis were obtained using rainfall data from an SCS flood hazard analysis report for El Paso County (Reference 11), with soil survey information being obtained from another SCS report for El Paso County (Reference 4).

The hydrologic results for Spring Creek and for Templeton Gap Floodway were developed using an SCS report entitled Procedures for Determining Peak Floods in Colorado (Reference 15). This methodology is consistent with those outlined in the City of Colorado Springs storm runoff criteria manual (Reference 16), and has been used widely to determine design capacities for flood-control projects throughout the city. For these basins, future development conditions were assumed to obtain the 100-year frequency flow rate. Field checks were carried out to check changes in land use since completion of drainage studies, to verify channel alignments, and to check major hydraulic structures which could affect basin hydrology. The assumption of fully developed conditions in the basins was acceptable for use in the current study. Since the drainage reports contained only 100-year peak discharges, flow rates for the 10-, 50-, and 500-year recurrence intervals were estimated in accordance with the procedures outlined in the Colorado Springs storm runoff criteria manual and the SCS Procedures for Determining Peak Flows in Colorado (References 16 and 15). The discharge-frequency relationship for Spring Creek was prepared by the study contractor, using the SCS methods in conjunction with the Colorado Springs storm runoff criteria manual (Reference 16). Soil information was obtained from an SCS survey of El Paso County (Reference 4).

Peak flow rates were developed by the study contractor for the Peterson Field Drainage using the Peterson Field Master Drainage Report (Reference 17), and the Colorado Springs Municipal Airport, Runway 17L-35R, Grading and Drainage Plan (Reference 18). Peak flows from the master drainage report were reevaluated by routing flows through the detention basins recommended in the Colorado Springs storm runoff criteria manual (Reference 16).

Peak discharges for Dry Creek and its tributaries were obtained from the Dry Creek Master Drainage Study (Reference 2). Analyses of the peak flow rates for the 10- and 50-year recurrence intervals were not available.

A regional relationship between basin characteristics and stream flow characteristics, as developed by the USGS (Reference 14) was used to define the discharge-frequency data for Monument Creek Tributary. The peak discharges for Monument Creek Tributary were reduced to account for temporary storage upstream from small culverts situated under two railroad embankments. Peak discharges downstream from the railroad embankments were computed by combining the reduced peak discharges through the culverts and the peak discharges from the intervening drainage area. The 500-year peak discharge on Monument Creek Tributary near the mouth also includes the 2,410 cfs that spill out of Monument Creek and flow around the north side of the island near the confluence of the two streams. Based on hydraulic analysis, this overflow channel, called Monument

Table 1. Summary of Peak Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Cottonwood Creek at Confluence With Monument Creek	18.1	3,100	7,300	10,000	20,200
Dry Creek					
At Centennial Boulevard	2.18	--[1]	--[1]	1,724	2,519
At Cascade Avenue	3.48	--[1]	--[1]	1,956	2,938
Fountain Creek at El Paso-Teller County Line	7.8	2,200	5,800	7,500	14,000
Fountain Creek at Confluence With Monument Creek	358.0	9,200	28,500	42,200	98,000
Fountain Creek at El Paso-Pueblo County Line	772.0	21,300	64,000	93,000	215,000
Jimmy Camp Creek at Confluence With Fountain Creek	66.4	8,500	12,400	16,000	20,500
Corral Tributary at Confluence With Jimmy Camp Creek	15.9	3,800	6,000	7,300	9,300
East Tributary Jimmy Camp Creek At Confluence With Jimmy Camp Creek	9.2	2,800	4,600	5,500	6,900
Franceville Tributary to Jimmy Camp Creek at Confluence With Jimmy Camp Creek	4.1	1,700	2,800	3,500	4,300

[1]Data Unavailable

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Table 1. Summary of Peak Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Mines Subtributary to Corral Tributary at Confluence With Corral Tributary	9.4	2,200	2,500	4,300	5,400
Kettle Creek at State Highway 83	16.3	2,600	6,600	9,300	19,300
Monument Creek at Northern Boundary of U.S. Air Force Academy	74.7	7,400	15,300	19,900	37,200
Monument Creek at Confluence With Fountain Creek	238.0	11,500	23,500	32,000	57,000
Monument Creek Tributary					
Cross Section C	1.4	890	1,620	1,880	2,880
190 Feet Downstream of Cross Section A	1.4	890	1,620	1,880	5,020[2]
Peterson Field Drainage at Confluence With Sand Creek	8.27	900	2,050	3,590	6,100
Pine Creek at Confluence With Monument Creek	9.7	2,300	5,500	7,600	15,400
Sand Creek at Confluence With Fountain Creek	53.0	3,520	7,860	10,160	15,790
Sand Creek Center Tributary at Confluence With Sand Creek East Fork	1.8	340	630	790	1,280

[2]Includes Monument Creek Bypass, Only 500-Year Flood

Table 1. Summary of Peak Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Sand Creek East Fork at Confluence With Sand Creek	26.3	1,980	4,250	5,420	8,240
Sand Creek East Fork Subtributary At Confluence With Sand Creek East Fork	6.5	410	1,000	1,300	2,000
Security Creek Upstream of Confluence With Windmill Gulch	3.7	2,700	4,300	5,400	10,100
Spring Creek at Confluence With Fountain Creek	6.7	960	1,790	2,340	4,340
Templeton Gap Floodway at Academy Boulevard	2.4	2,190	3,360	4,080	6,500
Widefield Creek at Confluence With Fountain Creek	15.1	4,600	7,700	10,000	24,000
Windmill Gulch at Confluence With Security Creek	4.5	1,300	3,500	5,000	10,100

Creek Bypass, would convey floodwater only during the 500-year flood. For the 500-year flood, the water-surface elevation would be high enough on Monument Creek to produce a peak discharge of 2,410 cfs in Monument Creek Bypass. This overflow enters Monument Creek Tributary at cross section B and then flows back into Monument Creek approximately 1,100 feet downstream of cross section A (Reference 3).

Peak discharge-drainage area relationships for the streams studied in detail in El Paso County are shown in Table 1.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Water-surface elevations were developed with the COE HEC-2 water-surface profile computer program (Reference 19). Flood profiles were drawn showing computed water-surface elevations for the 10-, 50-, 100-, and 500-year recurrence intervals.

Hydraulic analyses were not carried out to provide water-surface elevations for the 10- and 50-year recurrence intervals for Dry Creek and its tributaries.

Cross sections for the backwater analyses of the streams studied in detail were obtained from aerial topographic mapping compiled between 1972 and 1983 (References 20, 21, 22, 23, 24, 25, and 26). Fountain Creek cross sections were obtained from maps compiled by Bohannan and Huston, Inc., in 1972 (Reference 20), as well as from aerial topographic mapping compiled by Hogan and Olhausen, Inc., in 1975 (Reference 21). Cross sections for Jimmy Camp Creek and its tributaries were compiled from aerial photographs taken by the SCS in 1973 (Reference 22). Cross sections for Sand Creek were obtained from aerial topographic maps prepared by the SCS in 1972 (Reference 23), with cross sections of Sand Creek East Fork, Sand Creek Center Tributary, Sand Creek East Fork Subtributary, and portions of Sand Creek being obtained from aerial topographic maps compiled by Landmark Mapping in 1981 (Reference 24). Cross sections for Cottonwood Creek above Woodman Road were obtained from topographic maps prepared by the COE in 1975 (Reference 25). Cross sections for Monument Creek below the U.S. Air Force Academy were obtained from topographic maps prepared by Hogan and Olhausen, Inc., in 1975 (Reference 21).

Cross sections for Upper Fountain Creek, Security Creek, Widefield Creek, and Windmill Gulch were compiled from aerial topographic mapping prepared for the COE by VTN, Inc., in 1976 (Reference 26).

Cross sections for Cottonwood Creek below Woodman Road, Monument Creek above the U.S. Air Force Academy, Kettle Creek, Pine Creek, Peterson Field Drainage, Spring Creek, and Templeton Gap Floodway were obtained from aerial topographic mapping prepared by Landmark Mapping, Ltd., between 1981 and 1983 (Reference 24).

Cross section data for Monument Creek Tributary and the upper reaches of Monument Creek in the vicinity of Palmer Lake were obtained from aerial photographs compiled by Hogan and Olhausen (Reference 27) using photogrammetric techniques. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Supercritical and critical flow conditions predominate in the Upper Monument Creek reach and the Monument Creek Tributary due to steep channels. Water-surface elevations at cross sections in these reaches are based on critical depth. Starting water-survace elevations are based on critical depth or the corresponding water-surface elevations at the confluence of two streams (Reference 3).

A split flow occurs on Pine Creek at the Colorado State Highway 83 crossing due to the limited capacity of the culvert. Because the roadway embankment is sufficiently high to divert flows above 1,200 cfs to the south, all recurrence intervals coincide with the 100-year flood on the Pine Creek Overflow profile.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen using engineering judgment based on field observations of the streams and flood plains. Roughness values for the detailed-study streams ranged from 0.015 to 0.065 in the channels with values ranging from 0.020 to 0.080 in the overbank areas. These values correspond to concrete channels on the low end and densely vegetated overbanks on the high end of the scale. Photographs also aided in the documentation of channel and overbank roughness coefficients.

Starting water-surface elevations were either based on coincident condition elevations, the slope-area method, or elevations of an adjacent study.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year flood plain boundaries and 100-year floodway to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps as detailed below.

Flood plain boundaries for Fountain Creek and for Jimmy Camp Creek below cross section X were determined using topographic maps at a scale of 1:4,800 with a contour interval of 5 feet (Reference 20). Some cross sections for Fountain Creek, particularly those in and around the City of Colorado Springs, were determined using topographic maps at a scale of 1:6,000 with a contour interval of 5 feet (Reference 21). Flood plain boundaries for Jimmy Camp Creek above cross section X and its tributaries were determined from topographic maps at a scale of 1:2,400, with a contour interval of 2 feet (Reference 14). Flood plain boundaries for Sand Creek above the Colorado Springs corporate limit were determined using topographic maps at a scale of 1:2,400, with a contour interval of 4 feet (Reference 15). Flood plain boundaries for Cottonwood Creek above Woodman Road were determined using topographic maps at a scale of 1:2,400, with a contour interval of 2 feet (Reference 25).

Flood plain boundaries for Monument Creek below the U.S. Air Force Academy were determined using topographic maps at a scale of 1:6,000, with a contour interval of 5 feet (Reference 21). Flood plain boundaries were determined for Upper Fountain Creek, Security Creek, Widefield Creek, and Windmill Gulch using topographic maps at a scale of 1:2,400, with a contour interval of 2 feet. Flood plain boundaries were determined for Cottonwood Creek below Woodman Road, Monument Creek above the U.S. Air Force Academy, Peterson Field Drainage, Kettle Creek, Pine Creek, Sand Creek East Fork, Sand

Creek Center Tributary, Sand Creek East Fork Subtributary, Spring Creek, and Templeton Gap Floodway using topographic maps at a scale of 1:6,000, with a contour interval of 2 feet (Reference 26). Flood boundaries for Monument Creek Tributary were determined from aerial photographs at a scale of 1:4,800 (Reference 27). Dry Creek flood boundaries were determined using topographic maps at a scale of 1:1,200 with a contour interval of 2 feet (Reference 2).

Some flood plain boundaries for reaches studied by approximate methods were delineated using the existing Flood Hazard Boundary Maps for the City of Colorado Springs and El Paso County (References 28 and 29).

The 100- and 500-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map the 100-year flood plain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE); and the 500-year flood plain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

Hazardous velocities would occur during flooding on the upper reaches of Monument Creek near the Town of Palmer Lake and on Monument Creek Tributary under existing channel conditions (Reference 3). Encroachments, islands, and flood boundaries are subject to extreme erosion when velocities are so high. Therefore, the 100-year flood boundary was designated as the floodway as shown on the Flood Insurance Rate Map (Exhibit 2).

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the flood plain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary is shown. For Dry Creek and its tributaries, floodway data were not provided.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

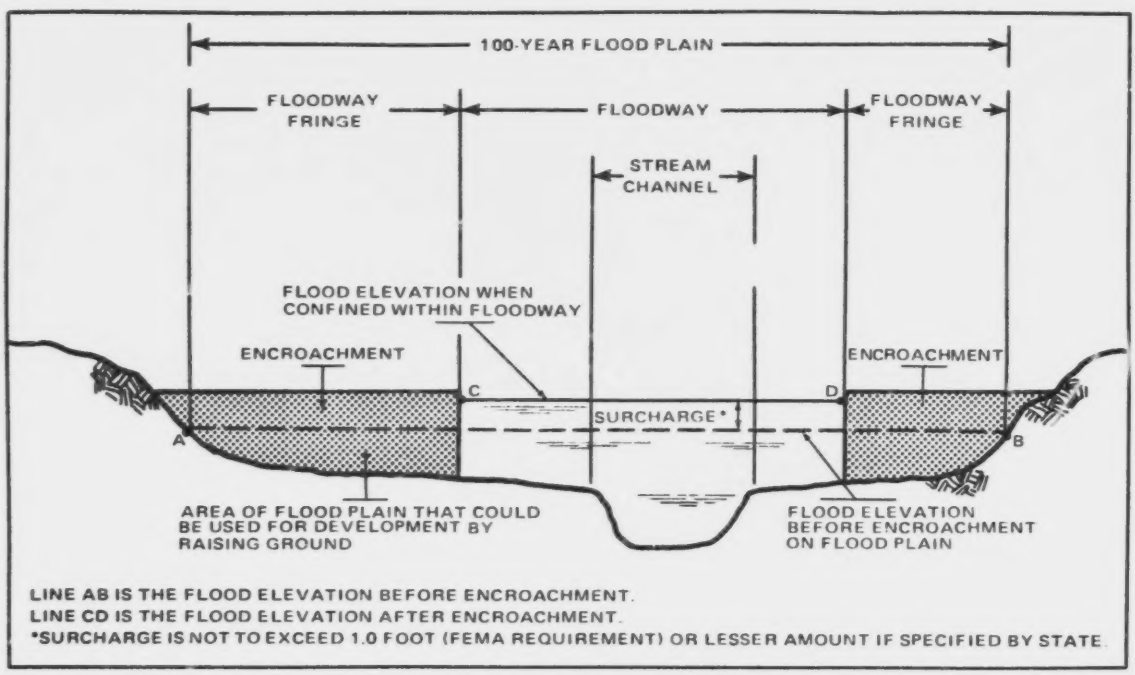
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

Figure 2. Floodway Schematic

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Cottonwood Creek								
L	4,731	101	742	13.5	6,322.8	6,322.8	6,323.3	0.5
M	5,331	96	717	13.9	6,332.8	6,332.8	6,333.5	0.7
N	6,211	77	620	16.1	6,350.4	6,350.4	6,350.8	0.4
O	6,891	81	649	15.4	6,362.0	6,362.0	6,362.6	0.6
P	8,131	100	675	14.8	6,385.2	6,385.2	6,385.2	0.0
Q	8,231	100[2]	897	11.2	6,390.0	6,390.0	6,390.0	0.0
R	8,471	101[2]	671	14.9	6,397.5	6,397.5	6,398.2	0.7
S	9,221	92[2]	651	15.4	6,413.3	6,413.3	6,413.7	0.4
U	11,101	127	740	13.5	6,447.1	6,447.1	6,447.1	0.0
W	13,411	160	765	12.0	6,483.3	6,483.3	6,483.3	0.0
X	14,131	110	650	14.2	6,497.2	6,497.2	6,497.2	0.0
Y	14,256	105[2]	649	14.2	6,499.4	6,499.4	6,499.4	0.0
AR	26,266	99[2]	570	13.7	6,684.9	6,684.9	6,684.9	0.0
AS	27,356	100	544	13.3	6,701.7	6,701.7	6,701.7	0.0
AT	28,651	110	565	12.8	6,721.8	6,721.8	6,721.8	0.0
AY	35,726	130	546	11.8	6,844.7	6,844.7	6,845.1	0.4
AZ	37,026	90	482	13.3	6,871.4	6,871.4	6,871.4	0.0
BA	37,237	70	449	14.3	6,874.8	6,874.8	6,874.8	0.0
BI	42,276	40	307	15.9	6,957.4	6,597.4	6,597.4	0.0
BJ	42,323	40	407	12.0	6,959.9	6,959.9	6,959.9	0.0
BK	42,482	57	345	14.1	6,961.3	6,961.3	6,961.3	0.0
BL	42,931	60	362	13.5	6,970.3	6,970.3	6,970.3	0.0
BM	45,461	90	431	11.3	7,010.2	7,010.2	7,010.2	0.0
BN	45,501	170	497	9.8	7,019.8	7,019.8	7,020.3	0.5
BO	45,551	300	2,802	1.7	7,021.1	7,021.1	7,022.0	0.9

[1]Feet Above Confluence With Monument Creek

[2]Floodway Lies Entirely Within the Corporate Limits

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Cottonwood Creek (Cont'd)								
BP	46,356	140	644	6.3	7,021.1	7,021.1	7,022.0	0.9
BQ	46,871	120	447	9.1	7,029.2	7,029.2	7,029.2	0.0
BR	47,150	290	528	7.7	7,051.4	7,051.4	7,051.4	0.0
BS	48,411	110	456	9.0	7,081.5	7,081.5	7,081.5	0.0

[1]Feet Above Confluence With Monument Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Fountain Creek								
A	3,970	2,730	21,379	4.4	5,167.4	5,167.4	5,168.4	1.0
B	5,680	2,700	15,295	6.1	5,171.0	5,171.0	5,172.0	1.0
C	7,710	1,120	8,267	11.2	5,184.5	5,184.5	5,184.5	0.0
D	9,975	1,950	14,999	6.2	5,195.3	5,195.3	5,196.2	0.9
E	11,440	1,600	10,366	8.3	5,201.8	5,201.8	5,201.8	0.0
F	13,510	1,250	10,146	8.5	5,211.1	5,211.1	5,211.8	0.7
G	14,820	1,450	11,806	7.3	5,216.1	5,216.1	5,216.6	0.5
H	18,140	1,350	10,082	8.5	5,227.4	5,227.4	5,227.5	0.1
I	19,945	1,700	11,316	7.6	5,234.5	5,234.5	5,235.4	0.9
J	22,280	1,650	8,270	10.4	5,246.7	5,246.7	5,246.7	0.0
K	22,680	1,650	10,981	7.8	5,250.1	5,250.1	5,250.4	0.3
L	24,635	1,850	14,419	6.0	5,254.7	5,254.7	5,255.7	1.0
M	25,625	1,750	9,353	9.2	5,259.1	5,259.1	5,259.6	0.5
N	27,190	1,550	13,114	6.6	5,267.7	5,267.7	5,268.6	0.9
O	28,680	1,600	12,515	6.9	5,273.3	5,273.3	5,274.0	0.7
P	30,380	1,600	12,017	7.2	5,281.2	5,281.2	5,282.1	0.9
Q	32,345	1,900	16,044	5.4	5,287.6	5,287.6	5,288.5	0.9
R	32,680	1,900	15,821	5.4	5,288.[illegible]	5,288.5	5,289.4	0.9
S	34,540	2,300	7,826	11.0	5,295.8	5,295.8	5,296.1	0.3
T	35,300	2,600	13,913	6.2	5,300.2	5,300.2	5,300.7	0.5
U	37,570	2,661	9,052	9.5	5,308.5	5,308.5	5,308.9	0.4
V	39,780	2,010	12,418	6.9	5,322.0	5,322.0	5,323.0	1.0
W	41,280	1,160	3,069	10.7	5,330.9	5,330.9	5,331.0	0.1
X	42,390	1,550	14,960	5.7	5,335.6	5,335.6	5,336.6	1.0
Y	43,940	1,343	7,493	11.2	5,340.8	5,340.8	5,340.8	0.0
Z	44,065	1,740	13,759	6.1	5,347.8	5,347.8	5,348.8	1.0

[1]Stream Distance in Feet Above Fountain Creek Mile 21.0

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Fountain Creek (Cont'd)								
AA	46,530	1,400	7,802	9.3	5,355.1	5,355.1	5,355.4	0.3
AB	46,650	280	3,956	18.3	5,359.3	5,359.3	5,359.3	0.0
AC	46,802	300	4,868	14.9	5,362.6	5,362.6	5,363.0	0.4
AD	47,600	850	11,020	7.8	5,365.8	5,365.8	5,366.8	1.0
AE	48,712	1,679	11,470	7.5	5,367.9	5,367.9	5,368.9	1.0
AF	49,832	1,830	16,100	5.3	5,371.7	5,371.7	5,371.8	0.1
AG	50,042	1,221	11,428	7.5	5,371.7	5,371.7	5,371.7	0.0
AH	51,110	1,050	7,166	12.0	5,375.0	5,375.0	5,375.1	0.1
AI	52,632	1,000	10,090	8.5	5,384.1	5,384.1	5,385.1	1.0
AJ	54,282	900	7,847	11.0	5,391.1	5,391.1	5,392.0	0.9
AK	55,482	670	7,467	9.6	5,397.7	5,397.7	5,398.1	0.4
AL	56,372	735	6,453	11.2	5,400.2	5,400.2	5,400.9	0.7
AM	57,322	885	7,135	10.1	5,405.8	5,405.8	5,406.5	0.7
AN	57,500	820	7,696	9.4	5,408.5	5,408.5	5,408.5	0.0
AO	58,630	1,200	9,456	7.6	5,411.2	5,411.2	5,412.0	0.8
AP	59,720	1,400	7,246	9.9	5,416.0	5,416.0	5,416.3	0.3
AQ	60,910	1,450	10,663	6.8	5,422.7	5,422.7	5,423.7	1.0
AR	62,300	1,050	7,851	9.3	5,428.2	5,428.2	5,428.7	0.5
AS	63,630	1,050	8,161	8.9	5,436.1	5,436.1	5,436.9	0.8
AT	65,020	760	5,885	12.4	5,444.5	5,444.5	5,444.5	0.0
AU	66,250	864	7,326	10.0	5,452.5	5,452.5	5,453.5	1.0
AV	67,265	730	6,665	11.0	5,457.6	5,457.6	5,548.5	0.9
AW	69,215	900	7,604	9.6	5,466.9	5,466.9	5,467.0	0.1
AX	71,410	900/650[2]	6,213	11.7	5,477.3	5,477.3	5,477.8	0.5
AY	72,830	426/326[2]	5,001	14.6	5,484.4	5,484.4	5,485.0	0.6
AZ	74,425	510/330[2]	5,824	12.5	5,493.3	5,493.3	5,493.5	0.2

[1]Feet Above Fountain Creek Mile 21.0

[2]Total Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Fountain Creek (Cont'd)								
BA	75,825	728	11,056	6.6	5,498.4	5,498.4	5,498.4	0.0
BB	77,030	700	7,999	8.4	5,500.1	5,500.1	5,500.1	0.0
BC	77,620	451	4,815	13.9	5,500.1	5,500.1	5,500.7	0.6
BD-BI In Fountain Only								
BJ	86,065	760	7,697	8.6	5,540.8	5,540.8	5,540.8	0.0
BK-BM In Fountain Only								
BN	92,605	1,760/1,100[2]	11,133	5.9	5,565.3	5,565.3	5,566.2	0.9
BO-BQ In Fountain Only								
BR	97,830	1,450/990[2]	8,341	7.9	5,598.6	5,598.6	5,598.9	0.3
BS	99,100	1,310/990[2]	8,303	7.9	5,608.2	5,608.2	5,609.0	0.8
BT	100,450	1,087/377[2]	6,898	9.6	5,616.9	5,616.9	5,617.9	1.0
BU	101,200	900/190[2]	7,180	8.9	5,623.2	5,623.2	5,623.2	0.0
BV	101,900	1,060/140[2]	8,179	7.8	5,625.9	5,625.9	5,626.3	0.4
BW	103,645	316/156[2]	3,411	18.8	5,638.5	5,638.5	5,638.5	0.0
BX	103,735	320/180[2]	3,838	16.7	5,639.8	5,639.8	5,639.8	0.0
BY	104,070	600/90[2]	7,683	8.4	5,644.4	5,644.4	5,644.4	0.0
BZ-CC In Fountain Only								

[1]Feet Above Fountain Creek Mile 21.0

[2]Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Fountain Creek (Cont'd)								
CD	107,385	570[2]	4,599	14.0	5,657.6	5,657.6	5,657.6	0.0
CE	10[illegible],185	388/178[3]	5,657	11.3	5,668.5	5,668.5	5,668.6	0.1
CF	111,125	550/100[3]	5,679	7.2	5,674.7	5,674.7	5,674.8	0.1
CG	112,145	495/390[3]	5,488	11.7	5,678.2	5,678.2	5,679.0	0.8
CH	113,035	540/160[3]	6,922	9.3	5,684.1	5,684.1	5,684.2	0.1
CI	114,470	800/280[3]	8,140	7.9	5,689.5	5,689.5	5,689.6	0.1
CJ	115,255	600	4,619	13.9	5,691.1	5,691.1	5,691.1	0.0
CK	117,370	850	7,140	9.0	5,702.7	5,702.7	5,703.6	0.9
CL	119,485	800	5,662	11.3	5,712.1	5,712.1	5,712.7	0.6
CM	121,435	1,267	9,633	6.5	5,722.8	5,722.8	5,723.7	0.9
CN	122,805	1,050	6,124	10.2	5,729.1	5,729.1	5,729.2	0.1
CO	124,395	1,150	7,844	8.0	5,739.3	5,739.3	5,739.7	0.4
CP	125,120	650	5,092	12.3	5,741.7	5,741.7	5,742.6	0.9
CQ	125,214	400	3,487	16.8	5,744.6	5,744.6	5,744.6	0.0
CR	125,331	410	4,054	14.5	5,746.0	5,746.0	5,746.0	0.0
CS	125,381	475	3,892	15.1	5,746.1	5,746.1	5,746.1	0.0
CT	125,487	700	8,102	7.2	5,749.9	5,749.9	5,749.9	0.0
CU	127,242	540	4,131	14.2	5,756.4	5,756.4	5,756.6	0.2
CV	128,350	650	5,951	9.9	5,763.4	5,763.4	5,764.4	1.0
CW	128,771	952	7,300	7.8	5,768.9	5,768.9	5,768.9	0.0
CX	129,571	1,046	11,130	5.1	5,773.2	5,773.2	5,774.2	1.0
CY	130,641	710	5,494	10.4	5,775.1	5,775.1	5,775.7	0.6
CZ	130,991	397	3,365	16.9	5,778.0	5,778.0	5,778.0	0.0

[1]Feet Above Fountain Creek Mile 21.0

[2]Floodway Lies Entirely Within Corporate Limits

[3]Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Fountain Creek (Cont'd)								
DA	131,113	310	4,765	12.0	5,780.7	5,780.7	5,780.8	0.1
DB	131,149	310	4,967	11.5	5,781.4	5,781.4	5,781.5	0.1
DC	131,449	770	8,518	6.7	5,782.9	5,782.9	5,783.0	0.1
DD	133,059	790	4,832	11.8	5,788.8	5,788.8	5,788.8	0.0
DE	134,399	330	3,464	13.9	5,796.4	5,796.4	5,796.4	0.0
DF	134,420	330	3,719	12.9	5,796.5	5,796.5	5,797.5	1.0
DG	135,998	800[2]	5,313	9.0	5,801.2	5,801.2	5,801.5	0.3
DH	138,750	450[2]	3,613	13.3	5,816.3	5,816.3	5,816.7	0.4
DI	139,725	186	2,358	20.4	5,823.8	5,823.8	5,823.8	0.0
DJ	139,810	196	2,919	16.4	5,825.7	5,825.7	5,826.7	1.0
DK	141,320	550	4,195	11.4	5,833.1	5,833.1	5,833.1	0.0
DL	142,485	400	3,256	14.7	5,838.4	5,838.4	5,838.4	0.0
DM	143,375	400	2,741	17.5	5,843.5	5,843.5	5,843.7	0.2
DN	143,400	400	4,050	11.9	5,846.4	5,846.4	5,847.4	1.0
DO	144,977	680/490[3]	2,815	11.2	5,855.0	5,855.0	5,855.0	0.0
DP	146,097	1,100/970[3]	5,921	7.8	5,859.4	5,859.4	5,860.2	0.8
DQ	147,737	275[2]	2,815	15.9	5,872.5	5,872.5	5,872.5	0.0
FE	173,541	390	2,398	8.5	6,088.9	6,088.9	6,089.1	0.2
FF	173,551	390	2,427	8.4	6,088.9	6,088.9	6,088.2	0.3
FG	174,541	340/290[3]	1,966	10.4	6,099.2	6,099.2	6,099.9	0.7
FH	175,101	420/250[3]	2,554	8.0	6,109.7	6,109.7	6,109.7	0.0

[1]Feet Above Fountain Creek Mile 21.0

[2]Floodway Lies Entirely Within the Corporate Limits

[3]Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Fountain Creek (Cont'd)								
FI	175,131	420/230[2]	2,644	7.8	6,109.8	6,109.8	6,109.8	0.0
FJ	175,240	580	3,130	6.5	6,111.9	6,111.9	6,112.4	0.5
FK	175,300	580	3,368	6.1	6,112.6	6,112.6	6,112.6	0.0
FL	176,261	320/150[2]	2,228	8.8	6,123.0	6,123.0	6,123.0	0.0
FM	176,967	320	2,336	8.4	6,134.9	6,134.9	6,135.8	0.9
FN	176,985	320[3]	2,391	8.2	6,135.0	6,135.0	6,135.9	0.9
FO	177,626	180[3]	1,542	11.1	6,141.6	6,141.6	6,141.7	0.1
FP	178,626	150	1,134	15.1	6,155.7	6,155.7	6,155.7	0.0
FQ	178,659	180	1,530	11.2	6,158.3	6,158.3	6,158.3	0.0
FR	179,049	300	2,661	6.4	6,159.2	6,159.2	6,159.9	0.7
FS	179,269	310/260[2]	2,120	8.1	6,160.7	6,160.7	6,161.2	0.5
FT	179,274	320/250[2]	2,173	7.9	6,160.8	6,160.8	6,161.3	0.5
FU	179,394	280/220[2]	1,939	8.8	6,162.9	6,162.9	6,163.5	0.6
FV	179,412	280/200[2]	2,046	8.4	6,163.1	6,163.1	6,163.9	0.8
FW	179,512	170[3]	1,240	13.8	6,163.4	6,153.4	6,164.2	0.8
FX	179,592	170[3]	1,247	13.7	6,166.0	6,166.0	6,166.0	0.0
FY	180,072	280[3]	1,958	8.7	6,171.7	6,171.7	6,171.8	0.1

[1]Feet Above Fountain Creek Mile 21.0
[2]Width/Width Within Unincorporated Areas
[3]Floodway Lies Entirely Within The Corporate Limits

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Upper Fountain Creek								
A	4,560	60	605	17.6	6,454.0	6,454.0	6,454.0	0.0
B	5,480	50	570	18.7	6,564.0	6,564.0	6,564.0	0.0
C	6,280	140	865	12.3	6,630.5	6,630.5	6,631.2	0.7
D	6,733	160	696	12.0	6,649.2	6,649.2	6,649.2	0.0
E	7,180	100	707	15.1	6,667.2	6,667.2	6,667.4	0.2
F	7,580	80	650	16.4	6,675.9	6,675.9	6,675.9	0.0
G	8,380	50	568	18.8	6,725.2	6,725.2	6,725.2	0.0
H	10,230	60	604	17.6	6,824.8	6,824.8	6,824.8	0.0
I	10,480	60	589	18.1	6,847.3	6,847.3	6,847.3	0.0
J	10,520	80	1,114	9.6	6,852.9	6,852.9	6,852.9	0.0
K	10,570	130	959	11.1	6,852.9	6,852.9	6,852.9	0.0
L	12,520	70	634	16.8	6,963.0	6,963.0	6,963.0	0.0
M	14,470	110	759	14.1	7,020.6	7,020.6	7,021.5	0.9
N	15,070	170	865	12.3	7,031.8	7,031.8	7,032.5	0.7
O	15,100	180	1,652	6.5	7,034.7	7,034.7	7,035.4	0.7
P	15,165	150	881	12.1	7,034.7	7,034.7	7,034.7	0.0
Q	15,965	70	628	17.0	7,055.0	7,055.0	7,055.0	0.0
R	16,515	220	930	11.5	7,095.8	7,095.8	7,095.8	0.0
S	17,305	60	607	17.6	7,126.5	7,126.5	7,126.5	0.0
T	19,855	90	677	15.7	7,199.1	7,199.1	7,199.1	0.0
U	20,660	60	632	16.9	7,233.1	7,233.1	7,233.1	0.0
V	21,810	60	556	17.3	7,263.2	7,263.2	7,263.2	0.0
W	22,610	100	680	14.1	7,287.2	7,287.2	7,287.2	0.0
X	22,760	160	765	12.5	7,294.0	7,294.0	7,294.8	0.8
Y	22,870	140	727	13.2	7,297.9	7,297.9	7,297.9	0.0
Z	22,900	90	923	10.4	7,297.9	7,297.9	7,298.1	0.2

[1]Stream Distance In Feet Above Fountain Creek Mile 57.0

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Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Upper Fountain Creek (Cont'd)								
AA	23,620	90	629	15.3	7,314.3	7,314.3	7,315.2	0.9
AB	23,770	170	697	13.8	7,328.0	7,328.0	7,328.7	0.7
AC	23,880	200	1,135	8.5	7,331.0	7,331.0	7,331.0	0.0
AD	25,180	160	733	12.1	7,379.1	7,379.1	7,379.1	0.0
AE	25,230	210	1,120	7.9	7,381.0	7,381.0	7,381.0	0.0
AF	25,310	290	1,071	8.3	7,381.0	7,381.0	7,381.0	0.0
AG	26,230	260	854	10.4	7,392.6	7,392.6	7,392.7	0.1
AH	26,260	200	1,176	7.5	7,395.4	7,395.4	7,395.4	0.0
AI	26,320	200	1,168	7.6	7,395.5	7,395.5	7,395.5	0.0
AJ	26,970	130	702	12.6	7,407.6	7,407.6	7,407.6	0.0
AK	27,250	200	1,503	5.9	7,410.9	7,410.9	7,410.9	0.0
AL	28,870	120	687	12.9	7,425.5	7,425.5	7,426.2	0.7
AM	29,670	140	699	12.7	7,438.2	7,438.2	7,438.2	0.0
AN	30,570	120	689	12.9	7,449.5	7,449.5	7,450.3	0.8
AO	31,650	130	766	11.6	7,466.9	7,466.9	7,467.8	0.8
AP	33,050	90	612	14.5	7,484.3	7,484.3	7,485.0	0.7
AQ	33,920	110	634	14.0	7,499.6	7,499.6	7,499.9	0.3
AR	35,870	230	836	10.1	7,533.4	7,533.4	7,533.4	0.0
AS	36,820	130	645	13.1	7,550.5	7,550.5	7,550.8	0.3
AT	36,850	180	1,106	7.7	7,552.3	7,552.3	7,552.5	0.2
AU	36,890	190	1,682	5.0	7,552.5	7,552.5	7,553.1	0.6
AV	37,440	150	749	10.7	7,556.5	7,556.5	7,556.9	0.4
AW	38,560	180	761	10.6	7,572.2	7,572.2	7,573.0	0.8
AX	40,113	100	581	13.8	7,595.7	7,595.7	7,595.7	0.0
AY	41,710	120	677	11.9	7,624.9	7,624.9	7,625.9	1.0
AZ	42,040	140	424	19.0	7,630.6	7,630.6	7,630.7	0.1

[1]Stream Distance In Feet Above Fountain Creek Mile 57.0

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Upper Fountain Creek (Cont'd)								
BA	42,070	130	988	8.1	7,635.6	7,635.6	7,635.8	0.2
BB	42,130	130	634	12.7	7,636.6	7,636.6	7,636.6	0.0
BC	43,680	90	602	13.4	7,670.9	7,670.9	7,670.9	0.0
BD-BJ In Town of Green Mountain Falls								
BK	49,690	70	487	15.4	7,791.2	7,791.2	7,791.2	0.0
BL	50,870	110	594	12.6	7,816.4	7,816.4	7,817.1	0.7
BM	52,070	100	556	13.5	7,843.5	7,843.5	7,844.2	0.7
BN	52,690	50	452	16.6	7,863.2	7,863.2	7,863.2	0.0
BO	53,240	110	588	12.7	7,870.6	7,870.6	7,871.5	0.9
BP	54,130	80	518	14.5	7,890.1	7,890.1	7,890.9	0.8
BQ	54,810	120[2]	590	12.7	7,912.2	7,912.2	7,912.9	0.7

[1] Stream Distance In Feet Above Fountain Creek Mile 57.0
[2] Floodway Lies Entirely Within The Unincorporated Areas of Teller County

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Jimmy Camp Creek								
A	780	180	1,307	12.6	5,501.5	5,501.5	5,502.5	1.0
B	810	180	1,400	11.8	5,502.5	5,502.5	5,503.0	0.5
C	2,195	850/450[2]	4,321	3.8	5,508.1	5,508.1	5,508.4	0.3
D	2,975	1,000[3]	2,948	5.5	5,508.9	5,508.9	5,509.7	0.8
E	3,565	500[3]	2,356	6.9	5,513.0	5,513.0	5,513.9	0.9
F	4,945	378[3]	1,831	8.7	5,521.4	5,521.4	5,521.4	0.0
G	5,105	250[3]	1,396	11.4	5,522.2	5,522.2	5,522.3	0.1
H	7,570	398/190[2]	1,971	7.9	5,534.4	5,534.4	5,534.4	0.0
I	7,620	329/180[2]	1,339	11.6	5,535.9	5,535.9	5,535.9	0.0
J	7,650	330	1,454	10.7	5,536.2	5,536.2	5,536.2	0.0
K	9,100	550/250[2]	2,264	6.9	5,545.5	5,545.5	5,545.7	0.2
L	10,007	550[3]	2,473	6.1	5,548.1	5,548.1	5,548.6	0.5
M	11,065	520[3]	1,620	9.4	5,552.5	5,552.5	5,552.7	0.2
N	12,120	470[3]	2,102	7.1	5,559.3	5,559.3	5,559.3	0.0
O	12,990	320[3]	1,304	11.5	5,563.3	5,563.3	5,563.3	0.0
P	13,940	346	1,645	9.1	5,572.0	5,572.0	5,572.0	0.0
Q	15,440	460	2,226	6.5	5,577.5	5,577.5	5,577.6	0.1
R	16,340	330	1,279	11.3	5,581.4	5,581.4	5,581.4	0.0
S	17,510	180	2,262	6.4	5,587.8	5,587.8	5,587.9	0.1
T	17,580	180	1,227	11.9	5,587.8	5,587.8	5,587.8	0.0
U	17,640	470	2,421	6.0	5,589.6	5,589.6	5,589.6	0.0
V	19,850	390	1,584	9.2	5,599.0	5,599.0	5,599.0	0.0
W	21,390	460	2,212	6.6	5,607.3	5,607.3	5,607.6	0.3
X	22,660	200	1,282	11.3	5,611.6	5,611.6	5,612.0	0.4
Y	22,960	230	1,226	11.8	5,616.5	5,616.5	5,616.6	0.1
Z	24,160	260	2,189	6.6	5,626.7	5,626.7	5,627.4	0.7

[1]Feet Above Confluence With Fountain Creek

[2]Width/Width Within Unincorporated Areas

[3]Floodway Lies Entirely Within Corporate Limits

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Jimmy Camp Creek (Cont'd)								
AA	25,770	180	1,464	9.9	5,632.5	5,632.5	5,633.1	0.6
AB	27,710	300	2,552	5.6	5,641.1	5,641.1	5,641.5	0.4
AC	30,850	140	926	15.4	5,652.4	5,652.4	5,652.4	0.0
AD	31,610	220	1,367	10.5	5,659.8	5,659.8	5,659.9	0.1
AE	33,590	570	2,391	5.9	5,668.8	5,668.8	5,669.4	0.6
AF	34,870	450	1,890	6.8	5,674.5	5,674.5	5,674.5	0.0
AG	35,090	650	3,215	4.0	5,675.6	5,675.6	5,675.6	0.0
AH	36,070	200	1,109	11.6	5,678.9	5,678.9	5,678.9	0.0
AI	37,850	380	2,504	5.2	5,687.7	5,687.7	5,688.5	0.8
AJ	40,800	320	1,082	11.9	5,701.4	5,701.4	5,701.4	0.0
AK	42,480	593	2,426	5.3	5,711.4	5,711.4	5,712.4	1.0
AL	43,750	440	1,375	9.2	5,720.5	5,720.5	5,720.6	0.1
AM	45,110	500	2,062	6.1	5,730.2	5,730.2	5,730.9	0.7
AN	47,160	225	1,218	10.3	5,741.7	5,741.7	5,741.9	0.2
AO	48,820	440	1,455	8.1	5,753.9	5,753.9	5,754.6	0.7
AP	49,960	340	1,590	7.4	5,762.4	5,762.4	5,762.6	0.2
AQ	51,500	252	1,222	9.7	5,772.9	5,772.9	5,772.9	1.0
AR	53,060	646	2,265	5.2	5,785.1	5,785.1	5,786.1	1.0
AS	54,660	160	878	13.4	5,803.1	5,803.1	5,803.1	0.0
AT	56,750	320	1,466	7.8	5,823.3	5,823.3	5,823.5	0.2
AU	57,440	390	1,168	9.2	5,830.2	5,830.2	5,830.3	0.1
AV	58,240	140	711	10.4	5,839.0	5,839.0	5,839.2	0.2
AW	59,460	110	648	11.0	5,849.0	5,849.0	5,849.0	0.0
AX	60,580	150	656	10.8	5,859.6	5,859.6	5,859.7	0.1
AY	61,260	170	686	10.3	5,867.0	5,867.0	5,867.0	0.0
AZ	61,390	150	757	9.4	5,867.5	5,867.5	5,868.3	0.8

[1]Feet Above Confluence With Fountain Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Jimmy Camp Creek (Cont'd)								
BA	61,420	120	573	12.4	5,873.5	5,873.5	5,873.5	0.0
BB	61,610	240	1,023	6.9	5,873.6	5,873.6	5,873.6	0.0
BC	62,460	120	672	10.6	5,877.4	5,877.4	5,877.9	0.5
BD	64,540	240	954	7.4	5,900.4	5,900.4	5,900.4	0.0
BE	66,150	130	582	11.8	5,919.3	5,919.3	5,919.3	0.0
BF	68,400	430	1,093	6.3	5,944.0	5,944.0	5,944.0	0.0
BG	70,160	170	610	10.8	5,962.9	5,962.9	5,963.1	0.2
BH	72,020	210	757	8.5	5,986.4	5,986.4	5,986.6	0.2
BI	74,140	170	668	9.6	6,008.9	6,008.9	6,009.3	0.4
BJ	75,630	240	820	7.8	6,024.7	6,024.7	6,025.0	0.3
BK	77,570	180	661	9.4	6,047.4	6,047.4	6,047.7	0.3
BL	79,560	120	634	9.8	6,070.6	6,070.6	6,071.2	0.6
BM	81,540	150	558	10.4	6,094.4	6,094.4	6,094.5	0.1
BN	83,590	160	636	9.1	6,120.7	6,120.7	6,121.5	0.8
BO	84,570	140	539	10.8	6,133.5	6,133.5	6,133.6	0.1
BP	85,820	240	732	7.5	6,148.7	6,148.7	6,149.0	0.3
BQ	86,060	200	653	8.4	6,150.8	6,150.8	6,151.3	0.5
BR	86,100	110	469	11.7	6,152.6	6,152.6	6,152.6	0.0
BS	86,400	110	511	10.8	6,156.2	6,156.2	6,157.0	0.8
BT	86,800	200	611	9.0	6,161.6	6,161.6	6,161.7	0.1
BU	88,340	190	602	9.1	6,181.7	6,181.7	6,181.7	0.0
BV	89,930	180	614	8.5	6,202.2	6,202.2	6,202.5	0.3
BW	91,000	140	492	10.6	6,218.3	6,218.3	6,218.3	0.0
BX	92,300	100	485	10.7	6,234.5	6,234.5	6,234.8	0.3

[1]Feet Above Confluence With Fountain Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Corral Tributary								
A	800	290	979	7.5	5,840.0	5,840.0	5,840.2	0.2
B	2,150	210	953	7.7	5,851.7	5,851.7	5,851.7	0.0
C	3,150	130	735	9.9	5,858.4	5,858.4	5,858.5	0.1
D	3,710	170	774	9.4	5,863.1	5,863.1	5,863.1	0.0
E	3,738	170	869	8.4	5,863.7	5,863.7	5,863.7	0.0
F	3,780	90	639	11.4	5,866.3	5,866.3	5,866.3	0.0
G	3,990	90	527	13.8	5,867.8	5,867.8	5,867.8	0.0
H	5,360	70	485	15.0	5,889.9	5,889.9	5,889.9	0.0
I	7,060	90	770	9.5	5,903.0	5,903.0	5,903.3	0.3
J	8,410	60	441	15.9	5,912.0	5,912.0	5,912.1	0.1
K	10,120	100	837	8.4	5,925.5	5,925.5	5,925.9	0.4
L	12,160	90	378	13.2	5,945.4	5,945.4	5,945.4	0.0
M	13,220	120	529	9.4	5,955.4	5,955.4	5,955.6	0.2
N	16,000	100	486	10.3	5,976.1	5,976.1	5,976.2	0.1
O	18,890	130	624	7.4	5,995.3	5,995.3	5,995.5	0.2
P	20,700	90	386	11.9	6,007.8	6,007.8	6,007.8	0.0
Q	22,410	70	456	9.7	6,023.7	6,023.7	6,023.9	0.2
R	24,600	80	351	11.7	6,043.7	6,043.7	6,043.7	0.0
S	26,780	150	640	6.4	6,063.8	6,063.8	6,064.2	0.4
T	28,820	110	368	10.6	6,081.9	6,081.9	6,081.9	0.0
U	30,050	210	656	5.9	6,093.4	6,093.4	6,093.9	0.5
V	31,310	140	376	9.3	6,106.7	6,106.7	6,106.7	0.0
W	31,530	110	353	9.9	6,110.0	6,110.0	6,110.0	0.0
X	31,580	110	347	10.1	6,110.8	6,110.8	6,110.8	0.0
Y	31,620	140	715	4.9	6,112.9	6,112.9	6,112.9	0.0
Z	31,720	140	669	5.2	6,113.0	6,113.0	6,113.0	0.0

[1]Feet Above Confluence With Jimmy Camp Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Corral Tributary (Cont'd)								
AA	32,080	160	371	8.6	6,115.6	6,115.6	6,115.7	0.1
AB	33,220	50	242	11.6	6,132.0	6,132.0	6,132.1	0.1
AC	34,892	80	281	10.0	6,154.2	6,154.2	6,154.2	0.0
AD	37,192	120	376	6.4	6,174.7	6,174.7	6,175.5	0.8
AE	38,252	50	200	11.0	6,187.9	6,187.9	6,187.9	0.0
AF	39,672	80	313	6.6	6,203.3	6,203.3	6,204.0	0.7

[1] Feet Above Confluence With Jimmy Camp Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
East Tributary Jimmy Camp Creek								
A	1,672	240	1,535	3.6	5,676.0	5,674.8	5,675.6	0.8
B	1,962	700	862	6.4	5,681.3	5,681.3	5,682.3	1.0
C	4,362	340	2,188	2.5	5,686.6	5,686.6	5,687.3	0.7
D	5,702	90	468	11.7	5,689.5	5,689.5	5,689.5	0.0
E	7,862	210	1,113	4.9	5,700.4	5,700.4	5,700.8	0.4
F	9,922	200	590	8.8	5,709.1	5,709.1	5,709.1	0.0
G	11,842	190	1,105	4.7	5,716.3	5,716.3	5,716.6	0.3
H	13,562	150	500	9.5	5,727.4	5,727.4	5,727.6	0.2
I	15,902	140	763	6.2	5,740.6	5,740.6	5,740.8	0.2
J	17,782	220	518	8.5	5,760.2	5,760.2	5,760.2	0.0
K	19,162	260	735	5.0	5,772.0	5,772.0	5,772.5	0.5
L	20,462	670	647	5.6	5,785.7	5,785.7	5,785.8	0.1
M	23,542	600	1,259	2.9	5,813.0	5,813.0	5,813.0	0.0
N	25,272	450	596	6.1	5,828.1	5,828.1	5,828.8	0.7
O	26,532	400	900	3.7	5,843.6	5,843.6	5,844.6	1.0
P	28,502	195	346	7.8	5,866.6	5,866.6	5,866.6	0.0
Q	30,442	190	550	4.9	5,882.8	5,882.8	5,883.1	0.3
R	30,662	200	613	4.4	5,884.7	5,884.7	5,884.7	0.0
S	30,704	200	580	4.7	5,887.2	5,887.2	5,887.2	0.0
T	30,804	280	996	2.7	5,887.2	5,887.2	5,887.2	0.5
U	32,164	230	435	5.5	5,898.3	5,898.3	5,899.0	0.7
V	33,244	350	518	4.6	5,910.4	5,910.4	5,910.6	0.2
W	34,324	150	318	7.6	5,921.7	5,921.7	5,921.7	0.0
X	36,344	130	255	7.9	5,954.3	5,954.3	5,954.3	0.0
Y	38,444	70	221	9.0	5,986.5	5,986.5	5,986.5	0.0
Z	40,934	110	187	7.2	6,025.3	6,025.3	6,025.4	0.1

[1]Feet Above Confluence With Jimmy Camp Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
East Tributary Jimmy Camp Creek (Cont'd)								
AA	42,144	198	240	5.6	6,059.0	6,059.0	6,059.0	0.0
AB	43,064	100	178	7.6	6,080.9	6,080.9	6,080.9	0.0
Franceville Tributary To Jimmy Camp Creek								
A	2,310	50	265	13.2	5,838.7	5,838.7	5,839.0	0.3
B	3,810	90	410	6.8	5,860.8	5,860.8	5,861.0	0.2
C	5,290	430	642	5.1	5,879.6	5,879.6	5,880.1	0.5
D	8,270	360	992	3.1	5,901.0	5,901.0	5,901.7	0.7
E	9,170	190	423	7.3	5,906.7	5,906.7	5,906.9	0.2
F	11,330	250	557	5.6	5,932.1	5,932.1	5,932.3	0.2
G	13,030	130	409	7.1	5,947.2	5,947.2	5,947.6	0.4
H	13,730	120	318	9.1	5,954.7	5,954.7	5,954.7	0.0
I	15,530	130	365	7.7	5,975.9	5,975.9	5,976.4	0.5
J	16,870	170	437	6.4	5,988.8	5,988.8	5,989.2	0.4
K	17,840	521	333	8.6	6,001.1	6,001.1	6,001.6	0.5
L	20,290	450	1,005	1.7	6,008.9	6,008.9	6,009.8	0.9
M	21,390	400	342	5.0	6,022.4	6,022.4	6,022.6	0.2
N	22,220	300	413	4.1	6,032.7	6,032.7	6,033.4	0.7
O	23,760	110	153	6.7	6,068.5	6,068.5	6,609.0	0.5
P	25,660	76	123	7.3	6,118.6	6,118.6	6,118.6	0.0
Q	26,910	90	125	7.2	6,158.1	6,158.1	6,158.2	0.1
R	28,370	120	124	5.9	6,211.4	6,211.4	6,211.7	0.3

[1]Feet Above Confluence With Jimmy Camp Creek

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Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Mines Subtributary To Corral Tributary								
A	2,400	100	396	11.4	5,959.3	5,959.3	5,959.3	0.0
B	7,700	570	1,230	3.5	6,000.9	6,000.9	6,001.9	1.0
C	10,960	150	440	9.8	6,035.5	6,035.5	6,035.5	0.0
D	12,360	150	540	7.8	6,052.0	6,052.0	6,052.1	0.1
E	13,960	190	510	8.2	6,068.5	6,068.5	6,068.5	0.0
F	16,150	280	479	7.5	6,097.3	6,097.3	6,097.4	0.1
G	18,170	270	593	6.1	6,123.3	6,123.3	6,124.2	0.9
H	20,160	230	475	7.6	6,147.2	6,147.2	6,147.3	0.1
I	21,280	280	490	6.5	6,164.9	6,164.9	6,164.9	0.0
J	23,350	140	307	8.1	6,197.4	6,197.4	6,197.4	0.0
K	23,420	140	414	6.0	6,198.4	6,198.4	6,198.7	0.3
L	23,452	120	286	8.7	6,200.2	6,200.2	6,200.2	0.0
M	23,532	120	399	6.3	6,201.6	6,201.6	6,201.6	0.0

[1]Feet Above Confluence With Corral Tributary

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Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Kettle Creek								
A	0	95	825	11.3	6,593.6	6,593.6	6,593.6	0.0
B	1,120	130	706	13.2	6,604.4	6,604.4	6,604.4	0.0
C	2,000	95	685	13.6	6,616.7	6,616.7	6,616.7	0.0
D	2,720	130	838	11.1	6,625.9	6,625.9	6,626.8	0.9
E	3,120	100	643	14.5	6,631.4	6,631.4	6,631.4	0.0
F	3,150	100	829	11.2	6,633.3	6,633.3	6,633.3	0.0
G	3,930	120	896	10.4	6,644.5	6,644.5	6,644.9	0.4
H	4,780	90	738	12.6	6,657.8	6,657.8	6,657.8	0.0
T	18,940	142	620	9.6	6,849.4	6,849.4	6,849.4	0.0
U	20,320	136	613	9.7	6,868.5	6,868.5	6,868.5	0.0
V	21,090	80	472	12.6	6,880.8	6,880.8	6,880.8	0.0
W	22,530	99	514	11.6	6,896.7	6,896.7	6,896.8	0.1
X	23,380	160	624	8.7	6,906.5	6,906.5	6,906.5	0.0
Y	25,180	130	586	9.2	6,933.5	6,933.5	6,933.7	0.2
Z	26,880	138	667	8.1	6,954.7	6,954.7	6,954.8	0.1
AA	28,200	136	648	8.3	6,971.8	6,971.8	6,971.9	0.1
AB	29,110	88	503	9.2	6,976.1	6,976.1	6,976.1	0.0
AC	29,140	88	526	8.8	6,976.4	6,976.4	6,976.4	0.0
AD	30,630	96	478	9.7	7,007.6	7,007.6	7,007.6	0.0
AE	31,720	78	472	9.9	7,022.1	7,022.1	7,022.6	0.5
AF	32,650	80	428	10.9	7,034.3	7,034.3	7,034.6	0.3
AG	33,350	218	452	9.1	7,043.3	7,043.3	7,043.3	0.0
AH	35,350	131	491	8.3	7,072.8	7,072.8	7,072.8	0.0

[1] Feet Above State Highway 83

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Kettle Creek (Cont'd)								
AI	36,610	126	440	6.5	7,095.5	7,095.5	7,095.5	0.0
AJ	37,530	120	367	7.9	7,110.1	7,110.1	7,110.1	0.0
AK	38,290	111	310	9.3	7,123.0	7,123.0	7,123.0	0.0
AL	39,930	114	322	8.9	7,150.1	7,150.1	7,150.1	0.0
AM	41,440	96	395	5.4	7,173.5	7,173.5	7,173.5	0.0
AN	41,470	96	400	5.4	7,173.6	7,173.6	7,173.6	0.0
AO	42,490	193	321	6.7	7,200.5	7,200.5	7,200.5	0.0
AP	43,530	101	354	6.0	7,217.6	7,217.6	7,217.6	0.0
AQ	44,580	74	163	8.6	7,237.4	7,237.4	7,237.4	0.0
AR	45,740	53	169	8.3	7,262.8	7,262.8	7,262.8	0.0
AS	46,770	37	137	10.2	7,284.7	7,284.7	7,284.7	0.0
AT	47,240	89	30	3.4	7,319.5	7,319.5	7,319.5	0.0
AU	48,120	41	123	7.6	7,333.4	7,333.4	7,333.4	0.0

[1]Feet Above State Highway 83

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Monument Creek								
BI	46,480	115	1,613	16.9	6,268.8	6,268.8	6,268.8	0.0
BJ	48,680	310	2,868	9.5	6,279.8	6,279.8	6,280.5	0.7
BK	52,380	220	1,729	15.7	6,302.6	6,302.6	6,302.6	0.0
BL	53,610	290	2,278	11.9	6,310.4	6,310.4	6,310.6	0.2
BM	55,360	230	1,866	13.9	6,320.8	6,320.8	6,320.9	0.1
BN	56,870	230	1,969	13.2	6,329.8	6,329.8	6,329.8	0.0
BO	57,910	220	1,858	13.0	6,335.0	6,335.0	6,335.6	0.6
BP	59,390	250	1,882	12.9	6,350.4	6,350.4	6,350.4	0.0
BQ	104,420	250	1,985	10.0	6,678.8	6,678.8	6,679.0	0.2
BR	105,890	300	1,900	10.5	6,687.2	6,687.2	6,687.2	0.0
BS	107,940	220	1,702	11.7	6,703.6	6,703.6	6,704.5	0.9
BT	109,040	250	1,802	11.0	6,717.0	6,717.0	6,717.0	0.0
BU	110,540	190	1,498	13.3	6,733.2	6,733.2	6,733.2	0.0
BV	111,530	250	1,683	11.8	6,741.3	6,741.3	6,741.3	0.0
BW	113,390	240	1,772	11.2	6,753.1	6,753.1	6,754.1	1.0
BX	114,190	140	1,090	14.5	6,760.3	6,760.3	6,760.9	0.6
BY	114,700	60	774	20.4	6,767.7	6,767.7	6,767.7	0.0
BZ	114,730	60	836	18.9	6,768.9	6,768.9	6,768.9	0.0
CA	115,360	270	2,895	5.5	6,776.2	6,776.2	6,776.5	0.3
CB	116,310	220	1,367	11.6	6,776.7	6,776.7	6,776.6	0.9
CC	118,310	160	1,084	14.6	6,795.4	6,795.4	6,796.4	1.0
CD	119,410	330	1,694	9.3	6,808.4	6,808.4	6,809.1	0.7
CE	120,260	230	1,570	10.1	6,815.6	6,815.6	6,816.3	0.7
CF	121,090	290	1,556	10.2	6,823.0	6,823.0	6,823.0	0.0
CG	122,190	250	1,635	9.7	6,829.0	6,829.0	6,829.9	0.9
CH	122,870	140	1,041	15.2	6,837.7	6,837.7	6,838.3	0.6
CI	123,670	200	1,439	11.0	6,845.0	6,845.0	6,845.7	0.7
CJ	123,700	200	1,304	12.1	6,845.7	6,845.7	6,845.7	0.0

[1] Distance In Feet Above Confluence With Fountain Creek

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Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Monument Creek (Cont'd)								
CK	124,480	400	3,475	9.5	6,847.9	6,847.9	6,848.9	1.0
CL	125,930	230	1,280	11.6	6,853.7	6,853.7	6,854.4	0.7
CM	126,930	230	1,277	11.6	6,864.0	6,864.0	6,864.2	0.2
CN	127,670	80	852	16.3	6,869.3	6,869.3	6,869.3	0.0
CO	127,700	80	853	16.3	6,869.5	6,869.5	6,869.6	0.1
CP	128,450	150	1,306	10.6	6,876.2	6,876.2	6,876.2	0.0
CQ	129,500	180	1,207	11.5	6,885.2	6,885.2	6,886.0	0.8
CR	130,330	180	1,018	13.7	6,919.1	6,919.1	6,919.1	0.0
CS	132,340	420	2,139	6.5	6,926.1	6,926.1	6,927.0	0.9
CT	133,470	300	1,234	11.3	6,936.3	6,936.3	6,937.1	0.8
CU	135,270	710	2,967	4.7	6,945.3	6,945.3	6,946.3	1.0
CV	136,010	170	1,194	11.6	6,959.3	6,959.3	6,959.4	0.1
CW	139,160	250	978	11.2	7,011.8	7,011.8	7,012.8	1.0
CX	140,360	300	1,992	5.5	7,019.4	7,019.4	7,020.3	0.9
DB	142,310	210	1,070	10.3	7,050.0	7,050.0	7,050.9	0.9

[1]Distance In Feet Above Confluence With Fountain Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Monument Creek Tributary								
A	980	310	717	2.6	6,955.0	6,947.2	6,947.2	0.0
B	1,315	390	324	5.8	6,955.0	6,949.0	6,949.0	0.0
C	1,405	140	244	7.7	6,955.0	6,951.3	6,951.3	0.0
D	1,765	210/150[2]	290	6.5	6,957.6	6,957.6	6,957.6	0.0

[1]Feet Above Confluence With Monument Creek

[2]Width/Width Within Unincorporated Areas

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Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Peterson Field Drainage								
A	[illegible]5	39	253	14.6	5,813.5	5,813.5	5,813.5	0.0
B	[illegible]9	39	292	12.7	5,814.5	5,814.5	5,814.5	0.0
C	1,[illegible]35	44	265	14.0	5,821.2	5,821.2	5,821.2	0.0
D	1,[illegible]65	41	257	14.4	5,827.4	5,827.4	5,827.4	0.0
E	[illegible]799	43	296	12.5	5,828.4	5,828.4	5,828.4	0.0

[1]Feet Above Confluence With Sand Creek

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Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Pine Creek								
A	500	61	481	15.8	6,288.6	6,288.6	6,289.2	0.6
B	1,440	156	1,280	5.9	6,297.2	6,297.2	6,298.2	1.0
C	2,180	50/20[2]	446	17.0	6,319.9	6,319.9	6,319.9	0.0
D	2,210	50/30[2]	773	9.8	6,325.5	6,325.5	6,326.5	1.0
E	2,730	42	397	17.2	6,330.1	6,330.1	6,330.8	0.7

[1]Feet Above Confluence With Monument Creek

[2]Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Sand Creek								
A	1,150	262	1,078	8.9	5,800.1	5,800.1	5,801.1	1.0
B	2,280	160	798	12.7	5,818.7	5,818.7	5,818.7	0.0
C	2,305	160	958	10.6	5,819.7	5,819.7	5,819.7	0.0
D	2,930	280/150[2]	963	10.6	5,829.5	5,829.5	5,829.8	0.3
E	3,360	440/230[2]	1,119	9.1	5,834.4	5,834.4	5,834.4	0.0
F	3,370	485[3]	1,958	5.2	5,835.1	5,835.1	5,836.1	1.0
AT	36,550	102[3]	461	9.7	6,345.7	6,345.7	6,345.7	0.0
AU	37,700	187	484	9.2	6,354.3	6,354.3	6,354.3	0.0
AV	38,650	223	512	8.7	6,373.8	6,373.8	6,373.8	0.0
AW	39,570	223[3]	493	8.9	6,389.6	6,389.6	6,389.6	0.0
AX	39,582	224[3]	619	7.1	6,390.4	6,390.4	6,390.4	0.0
AY	39,880	220	514	8.8	6,394.1	6,394.1	6,395.1	1.0
AZ	40,500	352/62[2]	624	7.2	6,402.5	6,402.5	6,403.4	0.9
CC	65,846	90	270	9.6	6,773.6	6,773.6	6,773.7	0.1
CD	66,446	50	218	11.9	6,782.6	6,782.6	6,783.3	0.7
CE	67,096	65	284	8.8	6,793.9	6,793.9	6,794.4	0.5
CF	67,946	50	213	11.7	6,804.5	6,804.5	6,804.5	0.0
CG	68,956	50	213	11.7	6,815.1	6,815.1	6,815.3	0.2
CH	69,376	205	347	7.2	6,823.9	6,823.9	6,824.5	0.6
CI	69,426	180	267	9.4	6,826.7	6,826.7	6,827.7	1.0
CJ	69,526	210	340	7.3	6,831.1	6,831.1	6,831.1	0.0
CK	69,606	195	334	7.5	6,832.5	6,832.5	6,832.5	0.0
CL	69,961	90	255	9.8	6,838.0	6,838.0	6,839.0	1.0
CM	70,776	226	506	5.1	6,847.4	6,847.4	6,848.3	0.9
CN	71,776	130	299	8.7	6,862.8	6,862.8	6,862.8	0.0
CO	72,721	80	255	10.2	6,876.5	6,876.5	6,878.5	0.0
CP	72,806	79	254	10.3	6,878.5	6,878.5	6,878.5	0.0

[1]Feet Above Confluence With Fountain Creek [2]Width/Width Within Unincorporated Areas

[3]Floodway Lies Entirely Within Corporate Limits

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Sand Creek Center Tributary								
G	6,740	60	102	7.4	6,171.9	6,171.9	6,172.5	0.6
H	7,960	57	107	7.1	6,186.3	6,186.3	6,186.3	0.0
I	9,080	8	41	12.8	6,209.9	6,209.9	6,210.9	1.0
J	9,180	125	163	3.2	6,213.1	6,213.1	6,214.1	1.0
K	9,900	20	64	10.2	6,215.5	6,215.5	6,216.5	1.0
L	9,940	20	64	10.2	6,215.5	6,215.5	6,216.5	1.0
M	10,980	119	157	5.7	6,229.3	6,229.3	6,229.3	0.0
N	11,990	100	84	5.2	6,244.4	6,244.4	6,244.7	0.3
O	12,820	30	79	9.3	6,252.8	6,252.8	6,253.0	0.2
P	13,680	70	93	7.0	6,270.6	6,270.6	6,271.6	1.0

[1] Feet Above Confluence With Sand Creek East Fork

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Sand Creek East Fork								
N	13,130	425	711	7.5	6,226.1	6,226.1	6,226.5	0.4
O	14,170	263	613	8.7	6,238.5	6,238.5	6,239.2	0.7
P	15,170	290	633	8.4	6,253.7	6,253.7	6,253.7	0.0
Q	15,270	290	1,005	5.3	6,254.0	6,254.0	6,255.0	1.0
R	16,200	228	582	9.2	6,268.8	6,268.8	6,268.8	0.0
S	16,900	300	678	7.9	6,277.3	6,277.3	6,277.5	0.2
T	17,570	321	690	7.7	6,291.4	6,291.4	6,292.0	0.6
U	17,640	326	667	8.0	6,291.4	6,291.4	6,292.1	0.7
V	18,490	388	1,598	3.3	6,293.4	6,293.4	6,294.0	0.6
W	19,570	367	683	7.8	6,307.2	6,307.2	6,307.6	0.4
X	21,100	413	706	7.5	6,326.4	6,326.4	6,327.1	0.7
Y	22,700	255	620	8.6	6,348.7	6,348.7	6,348.8	0.1
Z	23,680	397	706	7.6	6,359.9	6,359.9	6,359.9	0.0
AA	25,410	431	705	7.4	6,383.7	6,383.7	6,383.7	0.0
AB	27,080	353	667	7.8	6,401.0	6,401.0	6,401.5	0.5

[1] Feet Above Confluence With Sand Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Sand Creek East Fork Subtributary								
A	650	133	190	6.8	6,423.1	6,423.1	6,423.1	0.0
B	2,180	97	173	7.5	6,447.8	6,447.8	6,448.0	0.2
C	3,480	220	224	5.8	6,465.3	6,465.3	6,465.3	0.0
D	5,080	281	241	5.4	6,484.6	6,484.6	6,484.6	0.0
E	5,930	400	313	4.2	6,501.3	6,501.3	6,501.3	0.0
F	5,960	100	435	3.0	6,501.6	6,501.6	6,501.6	0.0
G	6,990	158	202	6.4	6,507.1	6,507.1	6,507.2	0.1
H	8,590	95	170	7.6	6,528.7	6,528.7	6,528.7	0.0
I	10,120	100	156	7.1	6,543.7	6,543.7	6,543.7	0.0
J	10,140	100	302	3.7	6,544.1	6,544.1	6,545.1	1.0
K	11,540	80	145	7.7	6,556.9	6,556.9	6,557.4	0.5
L	12,540	231	202	5.5	6,577.2	6,577.2	6,577.2	0.0
M	14,300	214	201	5.5	6,601.9	6,601.9	6,601.9	0.0
N	17,170	219	209	5.3	6,639.1	6,639.1	6,639.1	0.0
O	19,910	60	96	7.2	6,674.2	6,674.2	6,674.2	0.0
P	21,650	90	110	6.3	6,697.[illegible]	6,697.8	6,697.8	0.0
Q	23,900	100	112	6.1	6,729.2	6,729.2	6,729.3	0.1

[1]Feet Above Confluence With Sand Creek East Fork

Table 3. Floodway Data

Cross Section	FLOODING SOURCE: Distance[1]	FLOODWAY: Width (Feet)	FLOODWAY: Section Area (Square Feet)	FLOODWAY: Mean Velocity (Feet per Second)	BASE FLOOD ELEVATION: Regulatory (Feet)	BASE FLOOD ELEVATION: Without Floodway (Feet)	BASE FLOOD ELEVATION: With Floodway (Feet)	BASE FLOOD ELEVATION: Increase (Feet)
Security Creek								
A	630	113/100[2]	673	8.9	5,665.5	5,665.5	5,666.5	1.0
B	1,510	81/61[2]	233	11.7	5,672.8	5,672.8	5,673.0	0.2
C	1,985	169	521	6.3	5,678.3	5,678.3	5,679.3	1.0
D	2,665	156	448	8.3	5,683.1	5,683.1	5,683.6	0.5
E	3,300	228	520	7.1	5,688.1	5,688.1	5,688.8	0.7
F	3,415	237	467	7.9	5,690.0	5,690.0	5,690.1	0.1
G	3,480	292	315	4.5	5,690.0	5,690.0	5,690.6	0.6
H	3,800	250	675	5.5	5,691.8	5,691.8	5,692.8	1.0
I	4,470	245	717	5.2	5,694.1	5,694.1	5,695.1	1.0
J	5,850	25	644	5.7	5,704.5	5,704.5	5,704.5	0.0
K	7,600	113	338	8.6	5,712.6	5,712.6	5,713.1	0.5
L	8,230	223	750	3.9	5,715.2	5,715.2	5,715.8	0.6
M	9,340	234	609	4.8	5,722.2	5,722.2	5,722.7	0.5
N	9,900	94	442	6.6	5,727.3	5,727.3	5,728.3	1.0
O	10,020	247	744	3.9	5,729.0	5,729.0	5,729.4	0.4
P	10,765	170	514	5.6	5,732.5	5,732.5	5,733.5	1.0
Q	11,380	100	321	7.8	5,736.9	5,736.9	5,737.4	0.5
R	11,815	135	413	6.1	5,740.4	5,740.4	5,740.4	0.0
S	12,680	111	317	7.9	5,745.7	5,745.7	5,746.1	0.4
T	13,735	65	229	10.9	5,752.9	5,752.9	5,753.9	1.0
U	14,420	203	623	4.2	5,757.5	5,757.5	5,758.4	0.9
V	14,795	227	440	7.2	5,759.2	5,759.2	5,759.8	0.6
W	15,270	134	519	6.1	5,768.3	5,768.3	5,769.3	1.0

[1]Feet Above Confluence With Wildfield Creek

[2]Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Spring Creek								
A	1,700	40	228	10.3	5,851.7	5,851.7	5,852.7	1.0
B	1,740	40	256	9.1	5,853.5	5,853.5	5,853.5	0.0

[1]Distance In Feet Above Confluence With Fountain Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY				1% STORM ELEVATION		
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (No.1)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Tompleton Gap Floodway								
AN	21,685	100	422	7.1	6,426.0	6,426.0	6,427.0	1.0
AO	24,745	80	264	11.2	6,442.4	6,442.4	6,443.4	1.0

[1] Feet Above Confluence With Monument Creek

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Widefield Creek								
A	1,060	270/120[2]	1,208	8.3	5,642.5	5,642.5	5,643.2	0.7
B	1,885	150	952	10.5	5,645.9	5,645.9	5,646.8	0.9
C	2,495	140	748	13.4	5,650.9	5,650.9	5,650.9	0.0
D	2,750	86	1,289	7.8	5,662.8	5,662.8	5,662.8	0.0
E	2,855	76	1,043	9.6	5,664.1	5,664.1	5,664.1	0.0
F	3,040	110	1,017	9.8	5,665.5	5,665.5	5,665.5	0.0
G	3,585	150	506	4.4	5,666.1	5,666.1	5,667.1	1.0
H	4,335	62	213	10.5	5,671.0	5,671.0	5,671.0	0.0
I	4,805	176	534	4.2	5,675.3	5,675.3	5,675.3	0.0
J	5,375	208	437	5.1	5,677.7	5,677.7	5,677.7	0.0
K	5,840	130	312	7.2	5,687.4	5,687.4	5,687.4	0.0
L	6,790	100	246	8.3	5,697.4	5,697.4	5,698.0	0.6
M	7,930	320	306	6.7	5,721.1	5,721.1	5,722.1	1.0
N	9,210	742	2,237	1.2	5,722.4	5,722.4	5,723.4	1.0
O	10,095	130	308	8.8	5,728.1	5,728.1	5,728.1	0.0
P	10,605	200	407	6.6	5,736.5	5,736.5	5,737.3	0.8
Q	11,085	250	504	5.4	5,741.1	5,741.1	5,742.1	1.0
R	11,555	283	394	6.9	5,747.4	5,747.4	5,748.2	0.8

[1]Feet Above Confluence With Fountain Creek

[2]Width/Width Within Unincorporated Areas

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Windmill Gulch								
A	360	400	763	6.5	5,715.4	5,715.4	5,716.4	1.0
B	1,220	450	707	7.1	5,731.6	5,731.6	5,732.2	0.6
C	1,620	300	590	8.5	5,739.5	5,739.5	5,739.9	0.4
D	1,820	300	639	7.8	5,742.1	5,742.1	5,742.5	0.4
E	2,110	325	529	9.4	5,746.3	5,746.3	5,746.5	0.2
F	2,680	280	545	9.2	5,752.5	5,752.5	5,753.1	0.6
G	3,500	117	465	11.0	5,765.7	5,765.7	5,766.0	0.3
H	3,590	100	480	10.6	5,767.5	5,767.5	5,767.5	0.0
I	3,690	100	496	10.3	5,768.8	5,768.8	5,769.4	0.6
J	4,050	88	412	12.4	5,774.7	5,774.7	5,774.7	0.0
K	4,730	79	395	12.9	5,783.1	5,783.1	5,783.1	0.0
L	5,920	100	425	12.0	5,802.4	5,802.4	5,802.4	0.0
M	6,900	220	549	9.3	5,824.0	5,824.0	5,824.0	0.0
N	7,050	190	1,457	3.5	5,825.1	5,825.1	5,826.1	1.0
O	7,660	170	447	9.2	5,831.0	5,831.0	5,831.0	0.0
P	8,830	100	406	10.1	5,838.2	5,838.2	5,838.4	0.2
Q	9,100	161	482	8.5	5,845.5	5,845.5	5,845.5	0.0
R	9,380	265	530	7.7	5,855.2	5,855.2	5,855.2	0.0
S	9,430	361	961	4.3	5,856.6	5,856.6	5,856.6	0.0
T	10,600	220	522	7.9	5,862.1	5,862.1	5,862.1	0.0
U	12,590	190	460	6.7	5,880.3	5,880.3	5,880.3	0.0
V	14,140	84	132	7.2	5,901.6	5,901.6	5,901.6	0.0

[1]Feet Above Confluence With Security Creek

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheetflow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base

flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For flood plain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year flood plains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

Various studies have been used to compile this Flood Insurance Study. These reports were obtained from Federal, State, and local agencies, as well as through private developers. The agencies who either were contacted or contributed during the course of study included the COE, Albuquerque District; FEMA; SCS; U.S. Geological Survey; CWCB, PPACG; El Paso County Planning Department; and the City of Colorado Springs Engineering and Planning Department.

The COE prepared the Report on Hydrologic Investigations, Flood Insurance Studies of Colorado Springs and El Paso County, Colorado, in December 1976 (Reference 10). This was prepared under a contract with FEMA (Contract No. IAA-M-10-77), with the COE, Albuquerque District, acting as a study contractor. Many of the flows used in this study were adopted from that report; however, not all of the flows were utilized (See Section 3.1).

A report used for general information was the 1970 report entitled Comprehensive Drainage Plan for the Pikes Peak Region prepared by the PPACG (Reference 30). Flow rates were not used from this report because they were developed for future conditions, but the information was reviewed to compare peak 100-year flow rates on most of the streams studied in detail.

Studies reviewed for particular streams are detailed below.

Cottonwood Creek. The 1976 COE Flood Plain Information Report for Cottonwood Creek (Reference 31) and a 1979 Master Drainage Study prepared for the City of Colorado Springs (Reference 32) were reviewed to check their applicability to the present study. Flows in these reports were developed for future conditions and, therefore, were not used in this study.

Dry Creek and its Tributaries. Detailed hydrologic information from the Dry Creek Master Drainage Study, prepared by KKBNA, in 1984, (Reference 2), was utilized in this Flood Insurance Study report.

Fountain Creek. Four reports on Fountain Creek were prepared: an August 1974 Flood Plain Information Report which was revised in 1980 by PRC, Inc. (Reference 33); a March 1973 COE Flood Plain Information report (Reference 6); a 1980 Flood Insurance Study for the City of Manitou Springs (Reference 34); and a 1968 Flood Insurance Study for Fountain Creek, Arkansas River, and Dry Creek (Reference 35). The flows

of the first three reports correspond to the 1976 COE hydrologic investigation report (Reference 10). Flow rates used in the 1968 Fountain Creek Flood Insurance Study are lower than the corresponding flow rates in El Paso County because of the overbank storage considered in the 1968 study. The 1973 COE study (Reference 6) was used to obtain hydrologic information and hydraulic data for use in this Flood Insurance Study. The 1974 COE report was used to verify hydrologic information data for Fountain Creek above the Monument Creek confluence.

Jimmy Camp Creek. For Jimmy Camp Creek, two reports were published: a 1973 COE Flood Plain Information report (Reference 6), and a 1975 SCS flood hazard analysis (Reference 11). Flows and mapping were used from both reports.

Monument Creek. Two studies were prepared for Monument Creek: a May 1971 Flood Plain Information Report for Monument Creek in Colorado Springs (Reference 7), and a 1978 Flood Insurance Study for Palmer Lake, (Reference 3). Material from the former report was used south of the U.S. Air Force Academy. North of the Academy, hydrology developed for this study agrees in general with the Palmer Lake study. The corporate limits in this countywide study reflect the most recent information and hydrology. The discharges reflect these revisions, with the discharges in the current corporate boundaries of Palmer Lake being in general agreement with the 1978 study. At Red Rock Ranch Drive, the stream bottom is shown as the top of the road due to the limited capacity of the culvert. The hydrology for Monument Creek Tributary is found in the 1978 Flood Insurance Study for Palmer Lake (Reference 3). Except for revisions within the corporate limits which now show portions of the stream in the county, there is general agreement between the 1978 study and the current study.

Peterson Field Drainage. The hydrologic analysis was conducted for this Flood Insurance Study using information contained in the 1976 Peterson Field Master Drainage Planning Report (Reference 17), and the Colorado Springs Municipal Airport Runway 17L-35R, Grading and Drainage Report (Reference 18).

Sand Creek. The Flood Hazard Analysis for Sand Creek in Colorado Springs and El Paso County, Colorado, prepared in 1973 by the SCS (Reference 12), was revised to obtain hydrologic information for Sand Creek. Detailed topographic mapping and digitized channel cross sections were completed in 1981 and 1982 (Reference 24) to obtain information for the hydraulic analysis of Sand Creek.

Spring Creek. Detailed hydrologic information from the Bear Creek Drainage Plan, prepared by Lincoln-DeVore, Inc., in 1980 (Reference 36) was utilized in this Flood Insurance Study. The mapping used for the Spring Creek study area was obtained from Reids Aerial Mapping, Inc., (Reference 37), and Landmark Mapping, Ltd., (Reference 24).

Templeton Gap Floodway. Hydrologic information reviewed for this study was obtained from the Templeton Gap-North Shooks Run Drainage Basin Study, prepared in 1977 by Lincoln-DeVore, Inc. (Reference 38).

No detailed studies that could be compared to this study were located for Pine Creek, Kettle Creek, Security Creek, Widefield Creek, and Windmill Gulch, or the Templeton Gap Floodway.

A Flood Hazard Boundary Map has been published for the unincorporated areas of El Paso County (Reference 29). The flood plain boundaries shown on that map have been included in this study unless superseded by more detailed analysis.

A Flood Hazard Boundary Map has been printed for the adjacent unincorporated areas of Teller County (Reference 39). There is a disagreement in the 100-year flood plain boundaries along Fountain Creek for this study that supersedes the Flood Hazard Boundary Map at the county line. Crystal Creek Reservoir and Reservoir No. 8 have been studied as part of the Teller County Flood Hazard Boundary Map. Within El Paso County these reservoirs are defined as areas of undetermined, but possible, flood hazard. In all other areas the studies are in agreement.

A Flood Hazard Boundary Map has been printed for the adjacent unincorporated areas of Fremont County (Reference 40) and is in agreement with this Flood Insurance Study.

A Flood Insurance Study has been prepared for the adjacent unincorporated areas of Douglas County (Reference 41). Two unnamed flooding sources within El Paso County adjacent to Douglas County have been delineated using 100-year flood plain boundaries from the El Paso County Flood Hazard Boundary Map. These flooding sources within Douglas County have been designated as areas of undetermined, but possible, flood hazard. In all other areas, the two studies are in agreement.

A Flood Hazard Boundary Map has been prepared for the adjacent unincorporated areas of Pueblo County (Reference 42). There is some disagreement with the Pueblo County 100-year flood plain boundaries for Fountain Creek. This disagreement is due to a detailed analysis of Fountain Creek within El Paso County. In all other areas, the studies are in agreement.

Flood Hazard Boundary Maps for the Towns of Calhan, Ramah, and Monument (Reference 43, 44, and 45) have been published and were found to be in general agreement except where superseded by more recent corporate boundaries and hydrology.

Results of the Flood Insurance Study for the Cities of Colorado Springs (Reference 46), Manitou Springs (Reference 47), and Fountain (Reference 48), and the Town of Green Mountain Falls (Reference 49) have been revised to reflect the most recent hydrology and corporate boundary information. This is consistent with the countywide study.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of Commerce, Demographic Division of Local Governments, Department of Local Affairs, Colorado Population Figures, Colorado.

2. KKBNA, Incorporated, Dry Creek Master Drainage Study, January 1984.

3. U.S. Department of the Interior, Geological Survey, Flood Insurance Study, Monument Creek, and Tributaries, Palmer Lake, Colorado, 1978.

4. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey for El Paso County, Colorado, July 1981.

5. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate of the United States, Western States, 1974.

6. U.S. Department of the Army, Corps of Engineers, Albuquerque District, Flood Plain Information, Monument Creek, Colorado Springs, Colorado, March 1973.

7. U.S. Department of the Army, Corps of Engineers, Albuquerque District, Flood Plain Information, Monument Creek, Colorado Springs, Colorado, May 1971.

8. U.S. Department of the Army, Corps of Engineers, Definite Project Report on Templeton Gap Floodway, Colorado Springs, 1948.

9. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Central Region, Missouri, Flash Flood Program for Colorado Springs, and Fountain, Colorado, 1979.

10. U.S. Department of the Army, Corps of Engineers, Albuquerque District, Report on Hydrologic Investigations for the Flood Insurance Study of Colorado Springs and El Paso County, Colorado, December 1976.

11. U.S. Department of Agriculture, Soil Conservation Service, Colorado Water Conservation Board, Flood Hazard Analyses, Portions of Jimmy Camp Creek and Tributaries, El Paso County, Colorado, October 1975.

12. U.S. Department of Agriculture, Soil Conservation Service, in Cooperation with the Colorado Water Conservation Board, Flood Hazard Analysis, Sand Creek, City of Colorado Springs and El Paso County, Colorado, July 1973.

13. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Precipitation-Frequency Atlas of the Western United States, Atlas 2, Volume III - Colorado, 1976.

14. U.S. Department of the Interior, Geological Survey, in Cooperation with the Colorado Water Conservation Board, Technical Memorandum No. 1, Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado, 1976.

15. U.S. Department of Agriculture, Soil Conservation Service, Procedures for Determining Peak Flows in Colorado, March 1977.

16. City of Colorado Springs, Department of Public Works, Engineering Department, Determination of Storm Runoff Criteria Manual, City of Colorado Springs, March 1979.

17. City of Colorado Springs, Department of Public Works, Peterson Field Master Drainage Planning Report, 1976.

18. HNTP, Inc., Colorado Springs Municipal Airport Runway 17L-35R, Grading and Drainage Report, June 1982.

19. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, September 1971, updated July 1979.

20. Bohannan and Huston, Inc., Fountain Creek and Jimmy Camp Creek Aerial Topographic Mapping, Scale 1:4,800, Contour Interval 5 feet, April 1972.

21. Hogan and Olhausen, Inc., Fountain Creek and Monument Creek Aerial Topographic Mapping, Scale 1:6,000, Contour Interval 5 feet, May 1975.

22. U.S. Department of Agriculture, Soil Conservation Service, Jimmy Camp Creek Aerial Topographic Mapping, Scale 1:2,400, Contour Interval 2 feet, May 1973.

23. U.S. Department of Agriculture, Soil Conservation Service, Sand Creek Aerial Topographic Mapping, Scale 1:2,400, Contour Interval 4 feet, March 1972.

24. Landmark Mapping, Ltd., Aerial Topographic Mapping, Scale 1:6,000, Contour Interval 2 feet, February 1981 to March 1983.

25. U.S. Department of the Army, Corps of Engineers, Cottonwood Creek Aerial Topographic Mapping, Scale 1:2,400, Contour Interval 2 feet, April 1975.

26. VTN, Inc., Aerial Topographic Mapping, Scale 1:1,600, Contour Interval 2 feet, April 1976.

27. Hogan and Olhausen, Inc., Aerial Photographs, Town of Palmer Lake, Scale 1:4,800, Loveland, Colorado, May 1975.

28. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Maps, City of Colorado Springs, Colorado, Revised April 1978.

29. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, El Paso County, Colorado (Unincorporated Areas), Revised August 2, 1977.

30. Nelson, Haley, Patterson and Quirk, Comprehensive Drainage Plan for the Pikes Peak Region, May 1979.

31. U.S. Department of the Army, Corps of Engineers, Albuquerque District, Flood Plain Information Report, Cottonwood Creek, in Colorado Springs and El Paso County, Colorado, 1976.

32. City of Colorado Springs, Master Drainage Study, Cottonwood Creek, 1979.

33. U.S. Department of the Army, Corps of Engineers, Albuquerque District, Flood Plain Information Report, Fountain Creek in Colorado Springs and Manitou Springs, Colorado, August 1974, and revised by PRC, Inc., September 1980.

34. Federal Emergency Management Agency, Flood Insurance Study, Fountain Creek, Manitou Springs, Colorado, 1980.

35. U.S. Department of the Army, Corps of Engineers, Flood Insurance Study, Arkansas River, Fountain Creek, and Dry Creek, 1968.

36. Lincoln-DeVore, Inc., Bear Creek Drainage Plan, 1980.

37. Reids Aerial Mapping, Inc., Aerial Topographic Mapping, Scale 1:2,400, Contour Interval 2 Feet, September 1981 to March 1983.

38. Lincoln-DeVore, Inc., Templeton Gap-North Shooks Run Drainage Basin Study, 1977.

39. U.S. Department of Housing and Urban Development, Flood Hazard Boundary Map, Teller County, Colorado (Unincorporated Areas), Revised September 6, 1977.

40. U.S. Department of Housing and Urban Development, Flood Hazard Boundary Map, Fremont County, Colorado, (Unincorporated Areas), Revised June 27, 1978.

41. Federal Emergency Management Agency, Flood Insurance Study, Douglas County, Colorado, (Unincorporated Areas), 1980.

42. U.S. Department of Housing and Urban Development, Flood Hazard Boundary Map, Pueblo County, Colorado (Unincorporated Areas), Revised January 3, 1978.

43. U.S. Department of Housing and Urban Development, Flood Hazard Boundary Map, Town of Calhan, Colorado, January 17, 1975.

44. U.S. Department of Housing and Urban Development, Flood Hazard Boundary Map, Town of Ramah, Colorado, Revised February 20, 1976

45. U.S. Department of Housing and Urban Development, Flood Hazard Boundary Map, Town of Monument, Colorado, Revised October 22, 1976.

46. Federal Emergency Management Agency, Flood Insurance Study, City of Colorado Springs, Colorado, unpublished.

47. Federal Emergency Management Agency, Flood Insurance Study of Manitou Springs, Colorado, 1983.

48. U.S. Department of Housing and Urban Development, Flood Insurance Study, City of Fountain, Colorado, 1985.

49. U.S. Department of Housing and Urban Development, Flood Insurance Study, Town of Green Mountain Falls, Colorado, 1985.

10.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To ensure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the Regional Building Office, 101 West Costilla, Colorado Springs, Colorado 80903.

10.1 First Revision

This study was revised on March 16, 1989, to show modifications to the flooding along Pine Creek between the downstream confluence of the Pine Creek Overflow and the culvert conveying the Pine Creek Overflow beneath Academy Boulevard, as shown on Flood Insurance Rate Map Panels 0153 and 0154. The basis for this revision was a technical report entitled "Flood Plain Study, Chapel Hills Technical Center, Lot 9 Block 2," prepared by Olsson Associates, Colorado Springs, Colorado, and dated August 29, 1986. This report contained more detailed topographic data than that used in the original study as well as a revised hydraulic analysis of Pine Creek that included the effects of the existing twin box culverts beneath the Plaza at the Chapel Hills Shopping Center and an existing concrete channel located along the south side of the Chapel Hills Technological Center Subdivision. From this hydraulic analysis, it was determined that there was no longer a well-defined channel for this specific reach and that the area was subject to shallow flooding, or sheetflow. Because of the nature of the flooding along this reach, it was designated Zone AO, depth 1.0 foot. The existing base (100-year) flood elevations and floodway boundary delineations for this reach have been removed from the Flood Insurance Rate Map. The affected Floodway Data Table and profiles have also been revised to reflect this change. The remaining cross sections shown on the Flood Insurance Rate Map, Floodway Data Table, and profiles were not relabeled.

Due to discrepancies between the capacity of the culvert located beneath Academy Boulevard and the 1,000-cfs discharge modeled in the previous hydraulic analysis for Pine Creek Overflow, the detailed Special Flood Hazard Area along this stream was converted to approximate Zone A. However, the flood plain delineation along Pine Creek Overflow, as shown on Flood Insurance Rate Map Panels 0153 and 0154, remained the same as the delineation shown on the December 18, 1986, Flood Insurance Rate Map. Because no base flood elevations are shown for Pine Creek Overflow, Profile Panel 188P was deleted from the Flood Insurance Study report. The remaining profiles were not renumbered.

The Letter of Map Revision (LOMR) issued on October 5, 1988, for El Paso County was also incorporated into this revision. The basis for this revision was a modification to the Special Flood Hazard Area along Beaver Creek due to the construction of Bristlecone Dam and Lake in the Forest Lakes Subdivision as shown on Flood

Insurance Rate Map Panel 0020. In support of this LOMR, the following data were submitted:

- Certified "as-built" drawings for Bristlecone Lake, Dam, and Reservoir prepared by WCC, dated January 1987

- A copy of the November 13, 1986, letter from the Colorado State Engineer to Mr. Robert E. Byrd, landowner, accepting the dam for the storage of water

- A copy of the July 25, 1988, letter from R.E. Byrd & Associates to Mr. Randall outlining the proposed maintenance program to be eventually assumed by the Homeowners Association, or in case of their default, by the Forest Lakes Metropolitan District

- A copy of the proposed Operation and Maintenance Plan for Bristlecone Dam and Reservoir, prepared by WCC for Mr. Robert E. Byrd, dated March 1987

- A certified topographic map of Bristlecone Reservoir area and approximately 3,840 feet of Beaver Creek upstream of the reservoir's normal pool elevation of 6,885.0 feet showing the revised 100-year flood plain boundaries and revised cross section locations

As a result of this LOMR, the 100-year flood delineation, designated as approximate Zone A, was modified for an approximate 3,840-foot reach of Beaver Creek immediately upstream of Bristlecone Dam.

This revision also incorporated the following LOMRs issued for the City of Colorado Sprirgs:

1. The LOMR issued on March 26, 1987, for an area along the unnamed tributary to Douglas Creek North, is shown on Flood Insurance Rate Map Panel 0145. This LOMR was issued to show the effects of the relocation of the unnamed tributary to Douglas Creek North as a result of the construction of a concrete-lined channel west of the Oak Valley Residential Project. In addition, the Special Flood Hazard Area to the east of the Oak Valley Residential Project near the intersection of Allegheny Drive and Centennial Boulevard was revised to reflect the effects of a new storm sewer as well as curb and gutter improvements. This LOMR was based on the following submitted data: an engineering report entitled "Oak Valley Residential FEMA Discharge Study;" a 100-year flood profile along an unnamed tributary to Douglas Creek North; and "as-built" plans entitled "Oak Valley Drainage Channel" dated December 1981, prepared by Leigh Whitehead and Associates, and "Oak Valley Residential Street Improvement Plans, Including Sanitary Sewer and Storm Sewer," prepared by JR Engineering, Ltd., dated September 1986.

2. The LOMR issued on August 7, 1987, for an area along Douglas Creek North between Allegheny Drive and Pinon Park Drive, is shown on

Flood Insurance Rate Map Panel 0145. This LOMR was based on the construction of a concrete-lined channel. In support of this LOMR, an engineering report entitled "Douglas Creek North, Letter of Map Revision, City of Colorado Springs, El Paso County, Colorado," dated June 1987, prepared by Greiner Engineering, Inc., was submitted. This report contained "as-built" drawings and a hydraulic analysis for Douglas Creek North and an unnamed tributary.

3. The LOMR issued on September 3, 1987, for an area along Spring Run, is shown on Flood Insurance Rate Map Panels 0287 and 0290. The basis for this LOMR was a channelization project for an area along Spring Run located west of the bridge at Loomis Avenue and east of West Meadow Drive. In support of this LOMR, an engineering report, dated June 4, 1987, and prepared by Drexel, Barrell Engineers/Surveyors Inc., was submitted. This report included a hydrologic analysis for the basin, a HEC-2 computer analysis for the channel, and a revised flood plain delineation.

   The name of this stream was changed from Spring Run to Fisher's Canyon to be in agreement with the name shown on the U.S. Geological Survey topographic quadrangle map, at the request of the community. This change is reflected on the Flood Insurance Rate Map.

4. The LOMR issued on March 28, 1988, in the vicinity of the Pebble Way Bridge crossing along Dry Creek is shown on Flood Insurance Rate Map Panel 0153. This LOMR was based on bridge improvements at Pebble Way. In support of this LOMR. "as-built" construction plans entitled "Pebble Way Bridge Improvements," prepared by Simons, Li and Associates, Inc. (SLA), and dated July 1987; hydraulic analyses representing the effective and revised 100- and 500-year flood profiles, prepared by KIOWA Engineering Corporation; and revised flood profiles, prepared by SLA and dated December 1985, were submitted. Profile Panel 28P for Dry Creek was also revised to reflect this LOMR.

5. The LOMR issued on June 9, 1988, for an area along North Channel Dry Creek is shown on Flood Insurance Rate Map Panel 0153. The reason for the LOMR was to show the relocation of Woodman Road and drainage improvements along the North Channel Dry Creek from the upstream limit of study to a point approximately 3,000 feet downstream. This reach is now designated as approximate Zone A. In support of this LOMR, a technical report entitled "North Channel Dry Creek, FEMA Drainage Studies," prepared by JR Engineering, Ltd., and dated October 1987, was submitted. Profile Panel 36P has been revised and Panel 37P for North Channel Dry Creek has been deleted from the Flood Insurance Study report. The remaining profiles were not renumbered.

6. The LOMR issued on September 28, 1988, for a reach of the West Tributary of Sand Creek from Constitution Avenue to a point approximately 800 feet upstream is shown on Flood Insurance Rate

Map Panel 0164. In support of this LOMR, the following data were submitted:

- A portion of the "Sand Creek Master Drainage Plan Study, City of Colorado Springs and El Paso County," prepared by Simons, Li and Associates, Inc., and dated July 1985, which contained hydrologic and hydraulic analyses for the Palmer Park drainage area and Georgetown Square

- Plan and profile sheets 1 and 2 of 2 entitled "Academy Circle, Executive Park at Academy Sub. No. 4," prepared by United Planning and Engineering, dated March 23, 1978, and certified by a registered professional engineer

- "As-built" plans of the stormdrain, certified by a registered professional engineer and entitled "Executive Park at Academy Subdivision, Filing Number 8, Colorado Springs, Colorado," prepared by Mounument Valley Engineers, Inc.

- Plan Number 7706-7a, certified by a registered professional engineer, entitled "Georgetown Square Greenbelt from Constitution to Maizeland Road," prepared by R. Madrid and dated June 1977, showing the outfall of the storm sewer into Greenbelt Channel

- A topographic map entitled "Georgetown Square, 100-Year Flood Map revision," prepared by Hydro-Triad, Ltd., with the revised flood plain delineations

The basis for this LOMR was the construction of a stormdrain system and channelization project upstream of Georgetown Square. The stormdrain system and channelization intercepts stormflow and diverts it to Greenbelt Channel. As a result, the Zone A 100-year flood boundary delineation was modified to remove the Georgetown Square Subdivision from the 100-year flood plain.

The Flood Insurance Study report and Flood Insurance Rate Map for Colorado Springs, Colorado, have also been revised and are in complete agreement with this study.

10.2 Second Revision

This study was revised on September 28, 1990, to show flooding modifications along Crystal Creek, from approximately 70 feet upstream of the confluence with Monument Lake upstream to a point approximately 1,140 feet above Beacon Light Road; and Dirty Woman Creek, from a point approximately 60 feet downstream of Mitchell Avenue upstream to a point just below the southbound on-ramp of Interstate Highway 85-87. The basis for this revision was a technical report entitled "Flood Hazard Identification Report, Crystal Creek and Dirty Woman Creek," dated June 1986, prepared by the Colorado Water Conservation Board. This report contained detailed 100-year base flood hazard information which was utilized to update the

previously determined 100-year Zone A flood hazard information. Additional data in the form of corporate limit annexations and revisions were also included to update this Flood Insurance Study. The revised information is depicted on Flood Insurance Rate Map Panels 0010, 0040, and 0050. The Summary of Discharges Table (Table 1) has been revised and profiles have been added to this Flood Insurance Study to incorporate these changes.